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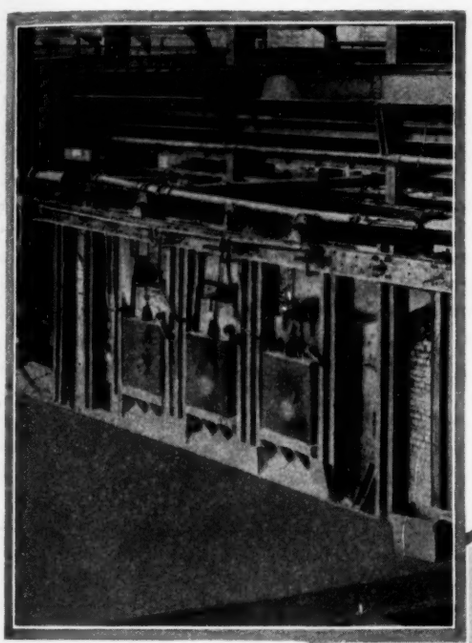
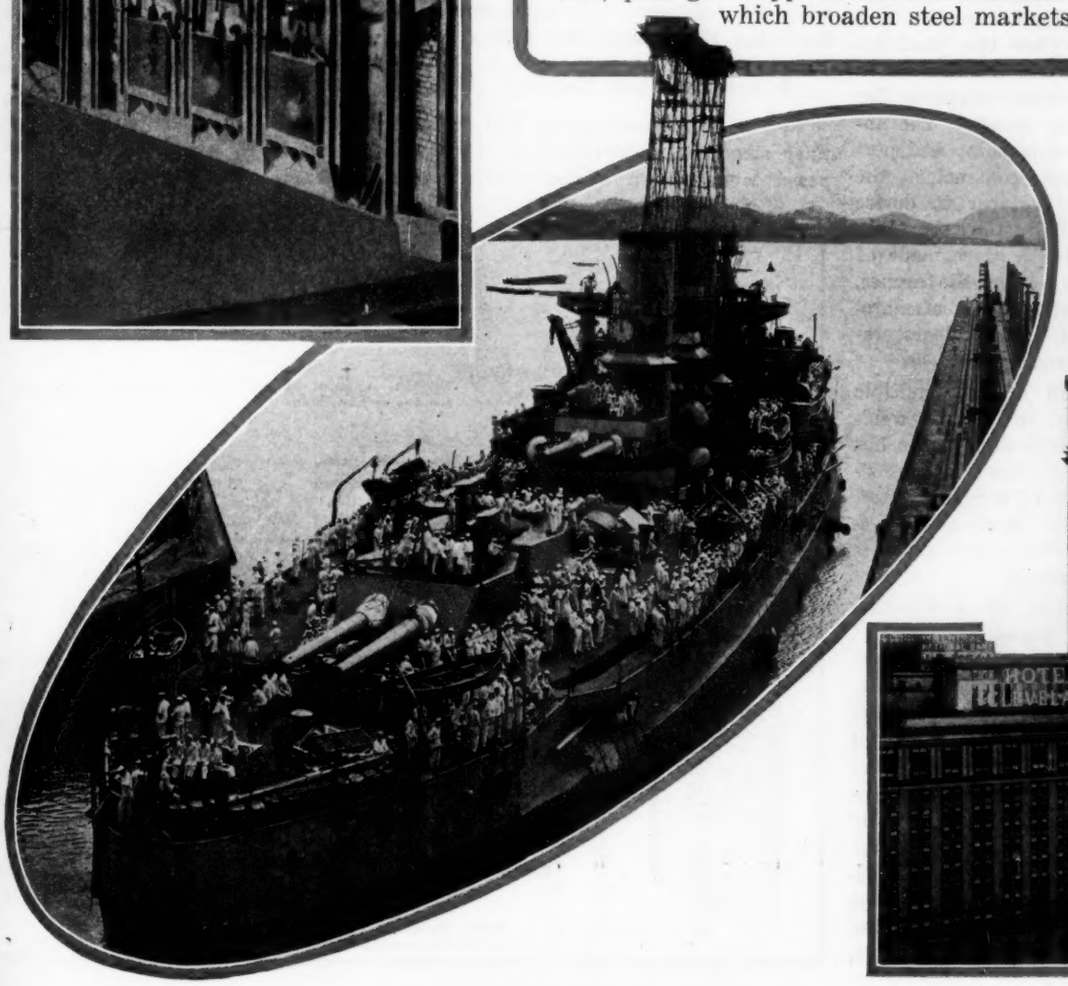
Would Build Floors of Steel Like Ship and Open-Hearth Decks



MORE than fanciful is the suggestion made by the chief engineer of the American Institute of Steel Construction that steel floor plates be used in office and commercial buildings, like they are on decks of battleships or the charging floors of open-hearth furnaces. He has worked out a complete system, described and illustrated on the following pages. Lighter weight, stronger construction, lower cost, plus good appearance and comfort are factors which broaden steel markets.



"Battleship Deck" Floor System Has Possibilities for Buildings

Proposed Floors of Steel Plate Welded To I-Beams Would Reduce Column Loads, Provide Greater Strength and Stiffness, and Decrease Cost of Construction

By Lee H. Miller

Chief Engineer, American Institute of Steel Construction

THE sole purpose for constructing a building is to provide a floor which can be protected from the weather by walls, windows and roof covering. The only reason for wanting a floor is to provide supports for a live load.

When the skyscraper came into existence it provided multiple tiers of floors, one above the other supported on a steel skeleton frame consisting of steel columns, girders and beams. At that time the steel industry furnished only the skeleton frame, which provided supports for the numerous floor panels. The industry stopped at this point and permitted the general contractor, the architect and the engineer to devise some means of filling in the floor panels which originally were made of brick arches, later of flat tile arches, and still later of other types of material such as wood, packed floors, reinforced concrete and gypsum.

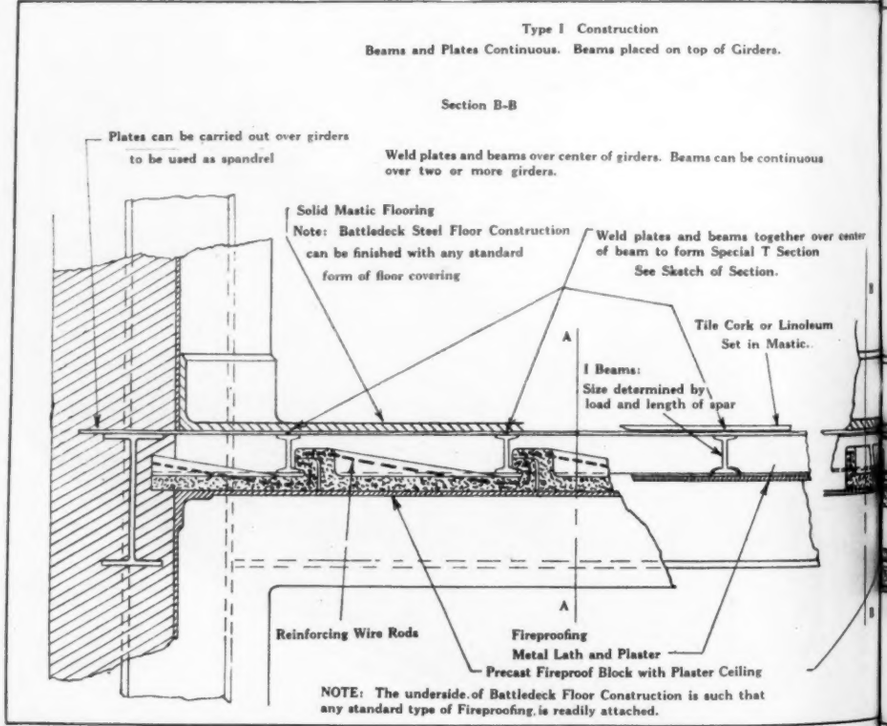
At the inception of the multiple story tier building, the art of welding, as it now exists, was unknown but progress in this field has made possible the development of a type of steel floor which should meet every requirement that a floor construction is called upon to perform.

Probably no part of a building structure, under present conditions, has been more unsatisfactorily developed than the floor panel construction, and yet it is the one reason for having a building. Modern methods of construction involve the use of material, in the floor panels, which constitute a dead load that generally weighs considerably more than the live load which is to be supported. This excessive dead weight of the floor panels must be carried into the skeleton frame, girders and columns, and ultimately to the foundations. It therefore is evident that one of the conditions which limits the heights of multiple story building will be the capacity of the foundations to carry the dead load of the structure, which is greater than the calculated live loads. A reference to the column schedule of a multiple story building will show that the column stresses for dead loads often are approximately two-thirds of the total stress, the other third being live load.

A Superior Floor Proposed

By the use of steel plates and ordinary structural steel beams, it is proposed to develop a welded steel floor which will be better than any floor that has been used before, and will stand every service to which it may be subjected. It will be a floor in which it is possible to determine in advance, the stresses in all parts, and a floor that will recover instantly a full 100 per cent of its deflection, due to live load when that load is removed. The one objection to such a floor system is that it has not been used before.

It is proposed to have 3-inch, 4-inch, 5-inch or other rolled I beams of whatever depth is found necessary, spaced 24 inches apart and spanning from girder to girder of the structural steel frame. Along the tops


Type I Construction
Beams and Plates Continuous. Beams placed on top of Girders.
Section B-B
Plates can be carried out over girders to be used as spandrel
Weld plates and beams over center of girders. Beams can be continuous over two or more girders.
Solid Mastic Flooring
Note: Battledeck Steel Floor Construction can be finished with any standard form of floor covering
Weld plates and beams together over center of beam to form Special T Section See Sketch of Section.
Tile Cork or Linoleum Set in Mastic.
I Beams: Size determined by load and length of span
Reinforcing Wire Rods
Fireproofing
Metal Lath and Plaster
Precast Fireproof Block with Plaster Ceiling
NOTE: The underside of Battledeck Floor Construction is such that any standard type of Fireproofing is readily attached.

of these beams will be laid continuous steel plates 3/16 or ¼ inch in thickness, and wide enough to leave a space between their edges approximately ¼ inch wide. The edges of the plates will be immediately over the center line of the webs of the small beams, and an automatic welding machine will work along this joint between the plates, welding the edges together and at the same time welding them to the top flange of the beam immediately over the web. The result will be a built-up T section with the plate acting as the upper flange and the beam acting as the vertical part of the T. The neutral axis of the combined T section will be close to the top flange of the beam, and when the lower flange of the beam is stressed 18,000 pounds per square inch, the plates and the top flange will have a stress of only 3000 to 4000 pounds per square inch.

By using a 3-inch 5 7/10-pound I beam, and a 3/16-inch plate, such a floor construction will carry a total load of 190 pounds per square foot on a 10-foot span with a deflection of 0.07 inch. The same floor will carry a total load of 85 pounds per square foot on a 15-foot span with a deflection of 0.157 inch. The weight of the steelwork, including beam and plates for this floor, will be 10½ pounds per square foot.

By using a 5-inch, 10-pound I beam spaced on 2 foot centers, and a ¼-inch plate, the combination will sustain a total load of 240 pounds per square foot on a 15-foot span with a 0.098 inch deflection, and on a 20-foot span will support a total load of 135 pounds per square foot with 0.174 inch deflection. The weight of the steelwork in this floor will be 15 2/10 pounds per foot.

It is assumed that this combination construction will be made continuous over the tops of the supporting girders, or by framing them into the girders flush on the top and have the floor plates continuous. The loads above given are based on fixed end supports, and the deflections are determined by the same basis.

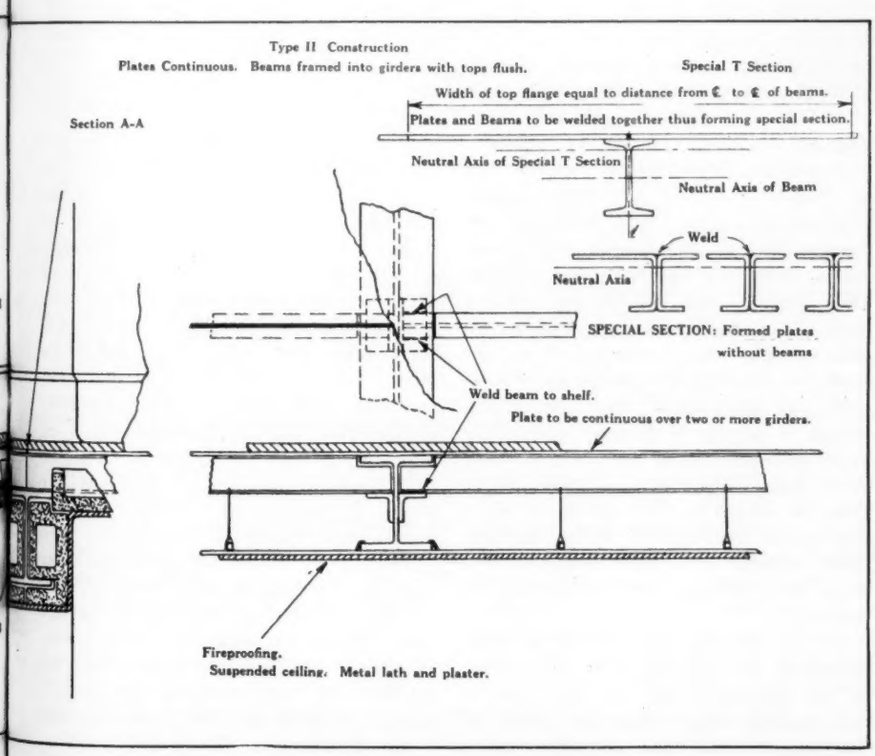
Strength and Deflection Shown

The next question which arises is what will be the strength and deflection of the plates between the supporting I beams to which they are welded, which are 24 inches apart. A ¼-inch plate will carry a uniformly distributed load of 562 pounds per square foot, and have a deflection of 0.115 inch between the small beams. This plate will carry a load concentrated between the small beams of 750 pounds per linear foot, and have a deflection of 0.057 inch. Under the same conditions the 3/16-inch plate will carry a uniform load of 316 pounds per square foot, or a concentrated center load of 422 pounds per linear foot. These loads are far in excess of what the T section will develop, and indicates that the floor construction is amply safe in both directions.

The cost of welding the bead between the edges of the plate and to the top of the beams has been estimated by different contractors, and one of them has stated that with automatic machinery it should be possible to deposit the bead weld for less than 2 cents per linear foot. Another contractor has stated that he is ready to enter into a contract for this welding at between 3 cents and 4 cents per square foot of floor. As the welding will be done along a line, but a short distance from the neutral axis, the difficulty of the floor curling up due to shrinkage will be practically negligible.

With this type of floor construction there is generated a solid steel deck which will act as a girder to prevent any torsional distortion of the building when subjected to wind or earthquake action. It will enable the engineer to select that part of his structure which is to carry the wind stresses to the foundations, and be assured that the deck flooring will deliver the stresses to the most rigid part of the vertical frame. The floor construction can be carried out into the walls to provide spandrel construction to support the outside walls. Of course it will be necessary to fireproof such a floor when the combustible contents of the structure will generate a heat that will produce a temperature in the steel in excess of 1000 degrees Fahr. This fire protection can be taken care of either by cast blocks of fireproofing inserted on the lower flange of the small beams, or by metal lath and plaster ceiling. Either type of construction will provide openings for conduits which can be carried along the main girders and transversely under the steel plates between the small beams. On the other hand if it is found advisable to do so, it will be possible to have a light fireproofing applied to the top of the steel plates and incorporating the various conduits which lay on top of the plates.

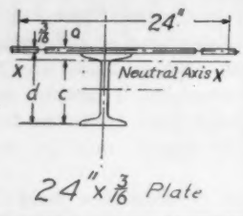
CROSS sections of the two types of "battleship deck" steel floor construction. Welding is employed throughout. Tile, cork or linoleum can be attached to the top surface. The undersurface forms the ceiling of the lower story, and metal lath and plaster are attached to it.


Type II Construction
Plates Continuous. Beams framed into girders with tops flush.
Special T Section
Width of top flange equal to distance from ℄ to ℄ of beams.
Plates and Beams to be welded together thus forming special section.
Section A-A
Neutral Axis of Special T Section
Neutral Axis of Beam
Weld
Neutral Axis
SPECIAL SECTION: Formed plates without beams
Weld beam to shelf.
Plate to be continuous over two or more girders.
Fireproofing.
Suspended ceiling. Metal lath and plaster.

Serves as Fireproofing

At the present time the specifications written to regulate the testing of floor construction do not contemplate a fire on the upper surface. However, it has been assumed that the filling

AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC.



BATTLEDECK FLOOR CONSTRUCTION

I is Movement of Inertia
S is Section Modulus
V is Maximum Web Shear
W_1 is Weight of Beam in pounds per linear foot
W_2 is Weight of Plate in pounds per linear foot
W_3 is Weight of Steel Floor Const. in pounds per sq. ft.

C is Coefficient of Strength for single span.
M is Maximum Movement in inch pounds.
V is Maximum Web Shear in pounds.

4" I

Type of Beam		Standard Beams															
Depth of Beam	d	4"		4"		4"		4"									
Weight of Beam	w_1	7.7		8.5		9.5		10.5									
Weight of Plate	w_2	15.3		15.3		15.3		15.3									
Weight of Floor	w_3	11.5		11.9		12.45		12.9									
	a	.690		.740		.796		.846									
	c	3.404		3.354		3.298		3.248									
Axis	I	12.508		13.287		14.214		15.083									
X-X	S	3.674		3.961		4.310		4.644									
Coef: Strength	C	44100		47500		51700		55700									
Max. Mom. "lbs.	M	66100		71300		77600		83600									
Max. Web Shear	V	9100		12100		15600		19200									

The Total Load tabulated for various span lengths is the Total Allowable Uniformly Distributed Load in Kips for continuous beam, as fixed by shear or flexure whichever is least.

The Total Allowable Concentrated Center Load for continuous beam and the total Allowable Uniformly Distributed Load for simple span beam may be obtained by dividing the Coefficient of Strength 'C' by the length of the span in feet.

Span in feet	Total Load in Kips	Load per square foot of floor	Deflection	Total Load in Kips	Load per square foot of floor	Deflection	Total load in Kips	Load per square foot of floor	Deflection	Total Load in Kips	Load per square foot of floor	Deflection	Total Load in Kips	Load per square foot of floor	Deflection
6	11.0	920	.020	11.9	990	.020	12.9	1080	.020	13.9	1160	.021	.	.	.
7	9.4	675	.027	10.2	730	.027	11.1	790	.028	11.9	855	.028	.	.	.
8	8.3	515	.035	8.9	555	.035	9.7	605	.036	10.5	655	.037	.	.	.
9	7.3	410	.044	7.9	440	.045	8.6	480	.046	9.3	515	.046	.	.	.
10	6.6	330	.055	7.1	355	.055	7.8	390	.056	8.4	420	.057	.	.	.
11	6.0	275	.066	6.5	295	.067	7.1	320	.068	7.6	345	.069	.	.	.
12	5.5	230	.079	5.9	250	.080	6.5	270	.081	7.0	290	.082	.	.	.
13	5.1	195	.093	5.5	210	.094	6.0	230	.096	6.4	245	.097	.	.	.
14	4.7	170	.107	5.1	180	.109	5.5	200	.111	6.0	215	.112	.	.	.
15	4.4	145	.123	4.8	160	.125	5.2	170	.127	5.6	185	.129	.	.	.
16	4.1	130	.140	4.5	140	.142	4.9	150	.145	5.2	165	.147	.	.	.
17	3.9	115	.158	4.2	125	.161	4.6	135	.163	4.9	145	.166	.	.	.
18	3.7	100	.177	4.0	110	.180	4.3	120	.183	4.6	130	.186	.	.	.
19	3.5	90	.197	3.8	100	.200	4.1	105	.204	4.4	115	.207	.	.	.
20	3.3	85	.219	3.6	90	.222	3.9	95	.226	4.2	105	.229	.	.	.
21	3.1	75	.241	3.4	80	.245	3.7	90	.249	4.0	95	.253	.	.	.
22	3.0	70	.265	3.2	75	.269	3.5	80	.273	3.8	85	.277	.	.	.
23	2.9	60	.290	3.1	65	.294	3.4	75	.299	3.6	80	.303	.	.	.
24	2.8	55	.315	3.0	60	.320	3.2	65	.325	3.5	75	.330	.	.	.
25	2.6	55	.342	2.9	55	.347	3.1	60	.353	3.3	65	.358	.	.	.

The Deflection tabulated above is the Total Deflection in inches for the Maximum Uniformly Distributed Load for continuous beams.
The Total Deflection in inches for Maximum Concentrated Center Load for continuous beams is 66.6% of those tabulated above.
The Total Deflection in inches for Maximum Uniformly Distributed Load for simple span beams is five times those tabulated above.
Live Load Deflection must not exceed 1/360 of the Span.

$$\text{Live Load Deflection} = \frac{\text{Total Deflection} \times \text{Live Load}}{\text{Total Allowable Load}}$$

LOADS BY A. I. S. C. SPECIFICATION

which is put on top of the ordinary floor panels to cover conduits, acts as a fireproofing for the top flange of beams and girders. On the other hand, if grate bars and furnace construction is a precedent, it should be possible to have a very considerable fire on the top of the steel plates without the temperature becoming dangerous. This is due to the fact that all heat generated from combustion will rise, and all air necessary to feed combustion must come from near the floor.

It will be possible to provide any form of treatment to the top surface of these plates, either mastic finish, linoleum, cork tile or other forms of coverings. The Armstrong Cork Co. has stated that it recently took a contract for furnishing approximately 40,000 square feet of cork tile floor for the Cleveland Terminal Tower building at a price of 42 cents per square foot. This cork tile is 3, 4, 6 or 12 inches square, and can be cemented to the top of the steel plates, providing any required Mosaic pattern and giving a floor that will eliminate the necessity of rugs, except as ornaments.

The total cost of a floor constructed of 3-inch I beams, 3/16-inch plates, covered on the top with cork tile and fireproofed on the under side with metal lath and plaster, will be in the neighborhood of $1 per square foot. It should be remembered in this connection, however, that the cork tile flooring eliminates the necessity of any other floor coverings, which is always a part of a tenant's expense when using an ordinary concrete floor. The cost of a good quality chenille carpet is from $1.25 to $1.50 per square foot, and the above referred floor system will cost complete less than the carpet, and eliminates its necessity.

It has already been stated that the objection to this floor is that there is no precedent for it, but this is not exactly true since the decks of battleships and the charging floors of open-hearth furnaces are made with 3/16 to ¼-inch plates, and are subjected to the most severe service that any floor can receive.

For bridge floor construction a combination of steel beams with checker plates could be assembled that would materially reduce the dead load of the structure and provide a lateral rigidity more satisfactory than any lateral floor diagonal now used. It will be found that at the present time checker plate floors are used to take care of the wear on wood floor bridges, and the question of their being slippery never has been raised.

This type of floor construction will weigh from 20 to 60 pounds less than any of the existing types now in use, and in connection with a proposed 75-story building with floor panels 21½ x 22½ feet the saving in dead load on the foundations for each column will be nearly 2,000,000 pounds.

Reports Railroad Grate Bar Experiments

Experiments by railroads in the use of grate bars of special cast irons and steels in the past seven or eight years was the subject of a committee report at the annual convention of the International Railway Fuel association in the Sherman hotel, Chicago, May 7-10. Of the 59 railroads from which information was received, 38 now use only plain cast iron; the remaining 21 roads use some special material for grates on about 2200 locomotives. Ten different kinds of cast steel or special cast iron have been reported as now in use. The use of special grate bar material appears to have been begun in 1921, but on the majority of the roads the applications have been made since 1926.

Of the 21 railroads using special material, 11 regard the duration of their experiments too short to warrant an opinion as to the relative economy of their use; seven roads regard the special materials as more economical than plain cast iron; one road finds them less economical. The two remaining roads made indefinite replies.

Forty of the 59 railroads buy or make their cast iron grates without any specifications for physical or chemical properties. These 40 railroads own 24,481 locomotives. The remaining 19 roads buy or make their cast iron grates to specifications, two of them specifying physical properties only. These 19 roads own 28,472 locomotives. Of 19 specifications received, nine are the same as specification A-48-18 of the American Society for Testing Materials.

Refrigerator Cold-Producing Units Made from Welded Sheet Steel

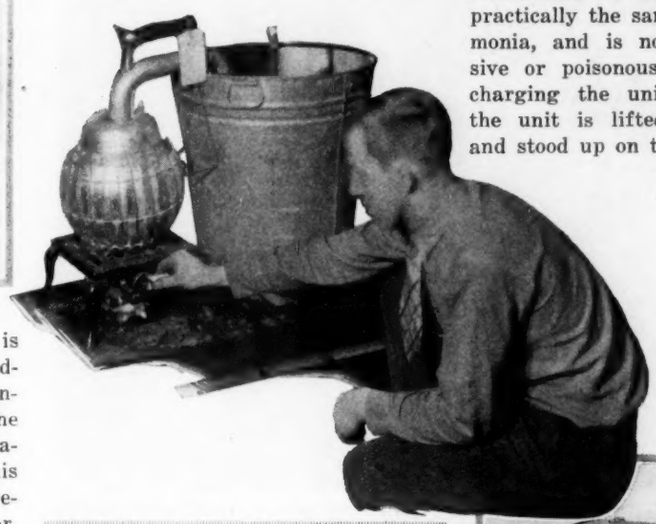
Parts for Unique Device Are Formed in Stamping Presses and Joined by Oxyacetylene Torch—Hot Galvanizing a Feature

By J. B. Nealey

SIMPLIFICATION in design is one of the great forces in modern civilization that is daily converting luxuries into necessities. The brief history of mechanical refrigeration affords a marked example of this process. First came the electric refrigerator; then the gas refrigerator, cast in one solid piece without a movable part; and now we have an entirely new household type which utilizes the cook stove to keep the food compartment cold. One of these refrigerators is shown in Fig. 3. As most cooking today is done with gas ranges, it might almost be called another gas refrigerator, although anything that makes heat—wood, coal, oil—will serve.

One heating of the cold unit is said to be sufficient to give refrigeration for 24 to 48 hours, depending upon the outside temperature. During this period, the refrigerator freezes ice cubes, desserts, salads, and the like, and, in addition to keeping the food compartment cold, it keeps it dry as well.

The cold-producing unit weighs about 35 pounds and is easily removed from and replaced in the food compartment by the housewife. As will be seen in Fig. 1, the cold-making ing device consists simply of two round balls connected with a length of pipe and equipped with a handle by which to carry it about. The ball on the right with the fins is called the hot ball and the other the cold ball, and these two balls with their connecting tube are sealed tightly so that the liquid contained inside cannot evaporate, even after years of use. The new refrigerator is a product of the laboratories of the Crosley Radio Corp., Cincinnati, and is being manufactured in a separate plant of this company. While only two years old it has had a wide distribution.



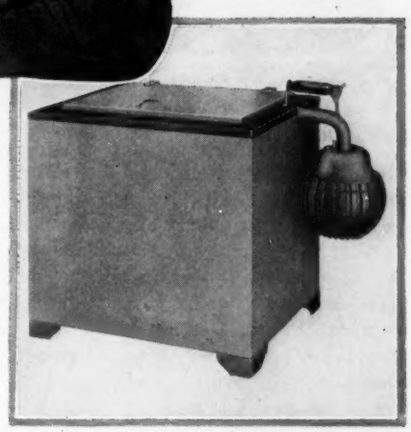


FIG. 1 (Upper left)—Refrigerator unit with stabilizer in place. Ball to the right is known as the hot ball and is heated daily to promote refrigeration which the ball to the left, or cold ball, provides. Fig. 2 (Center)—Heating refrigerating unit on special gas plate during final test. This room is equipped with several hundred of these burners. Fig. 3 (Lower right)—A refrigerator with cold-producing unit in place

The cold-producing unit contains about 14 pounds of a solution of ammonia and water, or aqua ammonia, practically the same as household ammonia, and is not dangerous, explosive or poisonous. The operation of charging the unit is simple. First, the unit is lifted from the cabinet and stood up on the hot ball with the end of the handle resting on the floor, in which position all of the liquid is drained into the hot ball. The hot ball then is heated, to separate the ammonia from the water, the former being driven off in the form of gas into the cold ball where it condenses. To accomplish this, the hot ball is placed over a fire and the cold ball into a tub of water, as illustrated in Fig. 2, the time required

for this being an hour and a half. To make the unit fool proof, a small whistle attached sounds off when the evaporation process nears the point of completion.

At that point the unit is removed from the fire and the hot ball submerged in a pail of water for a few minutes which starts the evaporation of the freezing liquid in the cold ball. The action then continues, through the affinity which water has for ammonia, and the latter is slowly drawn back into the hot ball. This causes the cold ball to drop quickly to a temperature of zero or below and it is then replaced in the cabinet, which it maintains at a temperature of 50 degrees Fahr. or lower.

During the heating period the liquid in the balls is raised to about 300 degrees Fahr. and 230 pounds pressure. When about 5 pounds of the ammonia has been driven over into the cold ball and the hot ball is immersed in cold water, the pressure at once drops to about 20 pounds. As soon as the water in the hot ball has dropped to approximately 140 degrees Fahr., the ammonia, which has been condensed into a liquid in the cold ball, begins to boil and the water in the hot ball starts absorbing the ammonia gas driven over. The hot ball remains hot as it takes up the heat from the cold ball and the fins act to give it a greater radiating surface through which to dissipate this heat.

About 12 cubic feet of 900 B.t.u. gas is required to heat and charge this unit and with gas at 75 cents per 1000 cubic feet the daily cost of operating this unit with this fuel is less than one cent. One generation of cold is claimed to be equivalent to nearly 30 pounds of ice.

The ammonia gas when driven off, passes through a liquid seal, inserted in the first part of the connecting tube and just above the hot ball. There is also a small dome of metal, soldered on top of the hot ball, in which is located the whistle. Water in this dome serves to keep the top of the hot ball sufficiently cool to cause immediate condensation of any water that is volatilized when the aqua ammonia solution is boiled. When the dehydration process is complete, steam from this dome water causes the whistle to function. This dome water is replaced when the hot ball is submerged.

A separate unit known as a stabilizer keeps the cabinet cold while the unit is being recharged. This consists of a small sealed tank containing about 14 pounds of water and glycerin with a depression in the top in which the cold ball rests.

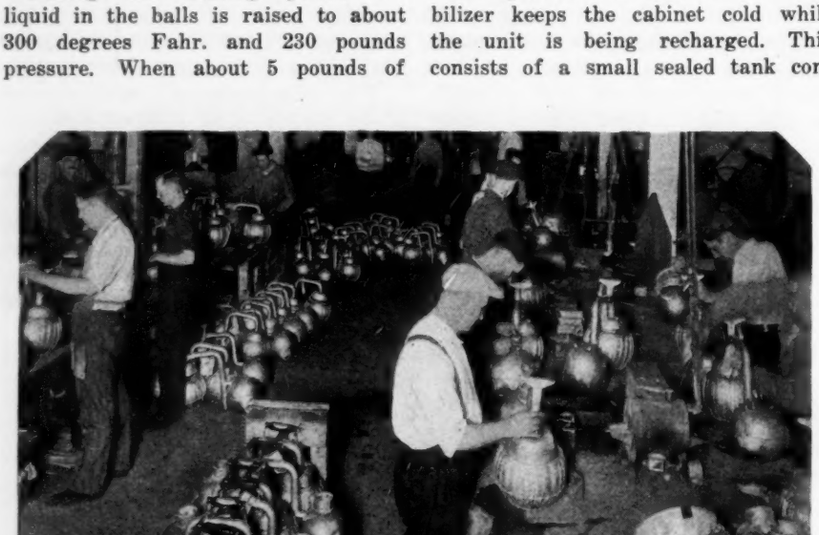


Fig. 4—Completing the assembly of the cold-producing units. The next step is a hydraulic test at 600 pounds pressure

The various processes and operations included in the manufacture of the cold unit have been placed in straight line progression and most of the handling of the parts and subassemblies is accomplished on continuous traveling or gravity conveyors. Each of the two balls is made in two parts, from steel stampings made in a single drawing operation. These two parts are welded together. One ball is 10 inches diameter and the other 9½ inches, while the connecting tube is 1¾ inches diameter and constructed of seamless rolled steel tubing. The steam dome also is a steel stamping with a bottom diameter of 7 inches.

All raw material is received in the stockroom where it is inspected and sorted into boxes which are delivered to various points as needed. The sheet steel is cut to size in shears and the pieces formed in a long line of punch presses equipped with special dies. The fins, which are curved V-shaped pieces of sheet steel, also are cut and formed here.

Welding is performed on gravity conveyors, one for the generator ball and one for the evaporator ball, each operator welding a different seam or attaching a different part. These two conveyor lines meet at the main assembly line where the two balls are welded to the connecting tube and the whole passed along to the hydraulic test. Oxyacetylene is used and a large acetylene generator is located in a fireproof room just adjacent to the welding assembly lines.

The hydraulic test is so arranged that five units are connected at one time and all are subjected to 600 pounds pressure. The strength of the welds and materials having thus been checked, the units are then tested with 200 pounds of air pressure so as to locate any leaks. An operator then spaces the fins about the generator or hot ball and clamps them securely with four jigs while binding them on with wire. The units are then moved by conveyor to the galvanizing department where they are first pickled and washed in a series of large vats.

Galvanizing Pots Gas Heated

Galvanizing is accomplished in three large tanks constructed of boiler steel an inch thick and welded together at the seams. These tanks, one of which is shown in Fig. 4, are five feet long, three feet wide and 30 inches deep, and are set in brick construction, the walls being of three courses of brick with a 3-inch space between them and the tank. Each tank is heated with gas burners so located that the flames impinge on the bottom while the brick walls and floor form a heating chamber from which little heat can escape. About six tons of zinc is kept in each tank and maintained at 850 degrees Fahr.

Automatic temperature controls are used and this temperature is maintained within plus or minus 5 degrees constantly. From 1½ to 1¾ pounds of zinc are used on each unit which indicates a zinc consumption of 1600 pounds for each tank every five days. At the same time the coating is being put on the molten zinc also acts to solder on the fins and the bond is so strong that it requires a hammer and considerable strength to pound one off.

This department is served with an

overhead monorail system and the units are put in fixtures and forced down into the molten zinc. Formerly it required four men, two on each end of the fixture, to do this work but recently a rail was installed on which one end of the fixture slides on wheels. Two men handle the other end and in this manner half the labor item was eliminated.

The first half of the top of the zinc bath is covered 3 inches deep with a flux consisting of salammoniac and sawdust. After the unit has been immersed from one to one and a half minutes it is pushed along, still immersed, to the other end of the tank where there is no flux, and then removed from the bath.

The units next are moved by conveyor to another department equipped with drill presses where the safety devices are placed. The caps are then soldered on and the saltres tested with 300 pounds of air pressure. The steam dome, whistle and other parts next are soldered on. The charge is introduced in a separate room to which the units are delivered by conveyor. A complicated system of special piping is used, each operator charging two units at a time, which necessitates the handling of six control valves, in addition to watching the individual weighing scales and vacuum pump.

The aqua ammonia solution is mixed in four high-pressure tanks located on the second floor, two of which supply the operators while the other two are being filled. The water used comes from a still located on top of the building which furnishes 25 gallons of pure water hourly to storage vats from which it is drawn for the mixing tanks.

As soon as the units have been charged they are taken by conveyor to the second floor where each one is put through a complete cycle of refrigeration, including heating and placing in test boxes in a room where a temperature of 90 degrees Fahr. is maintained for 24 hours. The units are then sprayed with aluminum paint, packed and dropped to the shipping department through gravity chutes.

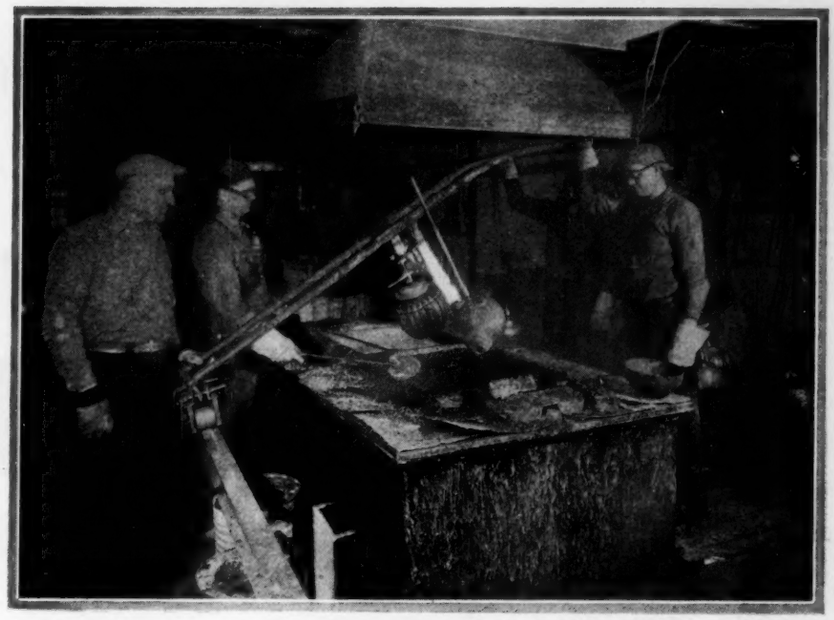


Fig. 5—The refrigerator units are galvanized by dipping into a gas-fired tank of molten zinc. The molten metal also serves to solder the cooling fins to the hot ball

Will Entertain American Foundry Visitors

Foreign visitors to the third International Foundrymen's congress to be held in London, June 11-15, will be entertained during their stay in that city. H. G. Sommerfield, honorary secretary, London branch, Institute of British Foundrymen, is in charge of arrangements and has been untiring in his efforts to provide an attractive program.

Lord Melchett, chairman, Imperial Chemical Industries Ltd. and Amalgamated Anthracite Collieries Ltd., and many other distinguished guests have promised to attend the banquet at the Hotel Cecil on June 12. A banquet also has been arranged at the Holborn Restaurant for May 23, to welcome the first contingent of Americans to arrive. On June 13 a reception, dance and cabaret will take place at the Burlington Galleries, Burlington Gardens. For June 14, plans have been made to take the visitors on a motor-coach tour to the ancient cathedral town of Canterbury, returning for tea at the Tudor House, Bearsted. On the return trip to London from the preconvention tour, visitors will have opportunity to visit the North-East Coast Exhibition at Newcastle-on-Tyne.

The Counterflo Heater Co. Salt Lake City, Utah, plans construction of a foundry.

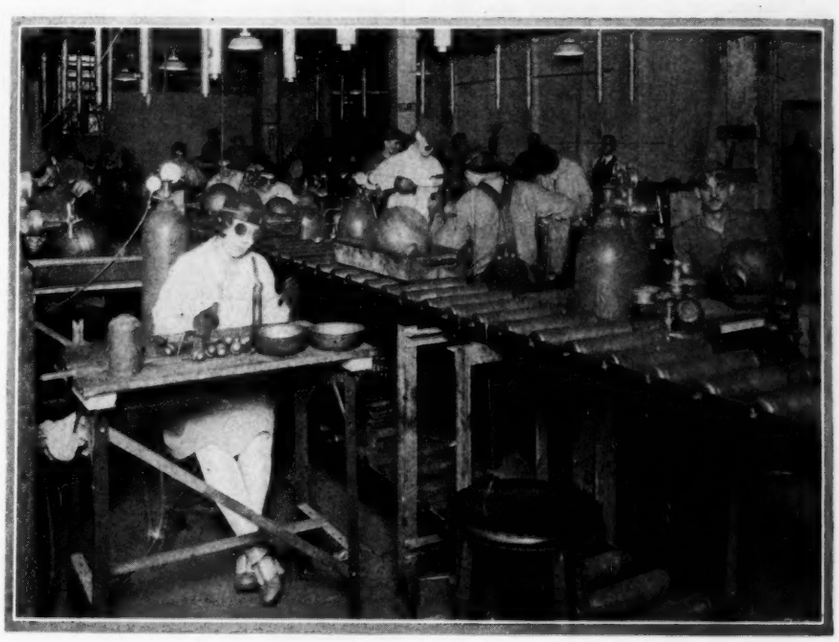


Fig. 6—Another view of the assembly line. All welding is by the oxyacetylene process

Large Uses of Steel in Small Ways

141st Article

Teletype Machines

Operating the full-page model

INVENTIVE skill constantly is contributing to the expanding uses of iron and steel through the creation of time and labor saving equipment for commercial work. The manufacture of the teletype, or "telegraphing typewriter," an industry born of the demands for quick communication in business, comprises one of the newer industrial units with an appetite for iron, steel and nonferrous metals.

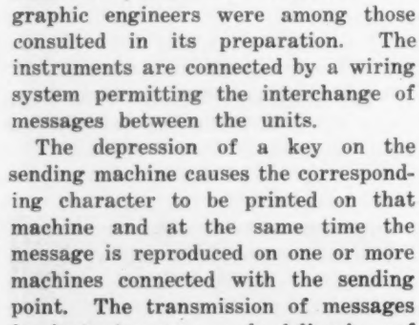
Sometimes referred to by its manufacturer as the telephone typewriter, the teletype actually is a distantly controlled typewriter. It was in various stages of development for more than 20 years, and foremost telegraphic engineers were among those consulted in its preparation. The instruments are connected by a wiring system permitting the interchange of messages between the units.

The depression of a key on the sending machine causes the corresponding character to be printed on that machine and at the same time the message is reproduced on one or more machines connected with the sending point. The transmission of messages is instantaneous, and deliveries of typewritten messages can be made at as many points as may be required. Many industries now are using this equipment for the transmission of orders and other information between plants.

THIS is the one hundred forty-first of a series of articles dealing with some of the obscure uses of steel which go far toward absorbing the American tonnage.

Among articles appearing every two weeks and not included in Vol. I containing 51 separate descriptions are:

Swords	*Bathroom Fixtures*
Paving Guards	*Snow Fences*
Reaction Kettles	*Stairs*
Fire Screens	*Cork Screws*
Voting Machines	*Universal Shafts*
Display Racks	*Sewing Machines*
Steel Stamps	*Lanterns*
Wire Screens	*Cleats*
Typewriter Spools	*Axes*
Chain Hoists	*Steel Ceilings*
Newspaper-Vending Boxes	*Card Tables*
Wire Lamp Shades	*Welding Rods*
Belt Fasteners	*Washing Machines*
Sap Spouts	*Resilient Road Guards*
Flexible Conductors	*Screw Drivers*
Foundry Flasks	*Windows*
	Car and Bus Seats



In this model the message is transcribed on narrow paper tape

The teletype resembles an ordinary typewriter, and is similarly operated. Its construction, however, is more sturdy than the usual typewriter, as it is in some cases operated continuously at the rate of 65 words a minute for periods of 16 to 24 hours daily. The teletype is made in two models, one which typewrites its message on a narrow ribbon of paper, and the other which typewrites its messages on a standard 8½-inch sheet.

The teletype is made almost entirely of metal parts. These vary in weight from one-tenth of an ounce to four pounds each, including the gray iron castings. The steel used consists of low carbon machine steel and high and low carbon alloy steel. Brass, bronze, copper and aluminum parts also are used. Other metals going into the manufacture of this equipment are German silver, tungsten and platinum in small quantities.

The fabricating largely is done by the manufacturer. The material for fabrication is received in forgings and special cold drawn shapes, as well as gray iron castings. The producer has designed and manufactured much of the metal working equipment, but uses standard machine tools for machining, grinding and buffing operations.

Special steels are used for the construction of such vital working parts as rollers, rachet wheels and driving clutches, which rotate at speeds as high as 360 a minute. Parts such as throw-out levers and spacer pinion shafts are subjected to wear and shock, and care is exercised in the selection of steels.

The approximate weight of the metal parts in each teletype machine is 40 pounds. Production of the teletype was started in 1909, and output now has reached approximately 50,000 units yearly.

A fund to provide a "Spirit of St. Louis" American Society of Mechanical Engineers gold medal in aeronautics has been established by the St. Louis section of the organization. The trust was accepted with the understanding that the initial award be made to Daniel Guggenheim.

Observe Diamond Jubilee of British Iron and Steel Institute

Old Organization Felicitated on Its Contributions to Advancement of Industry—Bessemer Medal Awarded to Sir Charles Parsons

THIS year's annual general meeting of the British Iron and Steel institute coincided with the diamond jubilee of the institute, and at the opening session Thursday, May 2, at the Institution of Civil Engineers, London, the president read a cablegram of greetings sent by Mr. Charles M. Schwab, who last year was awarded the Bessemer medal.

In the annual report it was stated that the total number of members Dec. 31, 1928, was 2008, an increase of 25 compared with 1927. The opening session was presided over by Benjamin Talbot, managing director of the Cargo Fleet Iron Co. Ltd., who was followed in the chair by Professor Henry Louis.

Professor Louis began his new duties by presenting the Bessemer gold medal to Sir Charles Parsons in recognition of his eminent services in the development of engineering science as applied to the manufacture of iron and steel. Professor Louis then presented his presidential address, which consisted of a short summary of the history of iron manufacture from its beginning, in which the author's object was to show that the progress of iron manufacture is a consequence and corollary of the ever-increasing power which mankind gradually learned to exercise over the production of heat.

The annual dinner was held in the evening of Thursday, May 2, and a considerable number of guests, including lady members of the institute, attended. The guest of honor was Sir Philip Cunliffe-Lister, president of the board of trade, who, in giving the toast of the Iron and Steel institute, alluded to the present condition of the iron and steel industry and pointed out that the industry does enjoy a certain number of assets. He was pleased to note that a definite step has been taken in the direction of reorganization by the amalgamation of concerns.

Discuss Blast Furnace Practice, Sound Ingots

THE technical session May 2, opened with the presentation of the report on "Blast Furnace Plant and Practice," prepared by a special committee of the institute consisting of A. K. Reece, of Weybridge, Surrey, chairman, G. Barrett, A. Crooke, E. H. Lewis, P. List, D. E. Roberts, and H. E. Wright. The various factors discussed in the report are as follows: Selection of raw materials; preparation of materials; mechanical handling of materials; furnace charging and top distribution; interior lines of the furnace; hot-blast stoves; gas cleaning; gas burning and surplus gas; blowing plant; power plant; dryblast; pig iron casting; general layout of the plant; use of recording instruments; oxygen enrichment of the blast. This paper was discussed with the following one, entitled: "Twenty Months' Results of Dry Blast Operation," by Edwin H. Lewis, formerly of the Glasgow Iron & Steel Co., Ltd., Wishaw. This paper adds the result of two years' investigations to the paper presented on the same subject by the author in 1927.

The discussion on these two papers was opened by Alfred Hutchinson, vice president of the institute, who emphasized the fact that in the United States the dimensions of blast furnaces are continually increasing, and who wondered how much further blast furnace hearths can be increased.

Professor Desch, referring to Mr. Lewis's paper, asked how traces of tar could be kept out of the silica gel used in the dehydration plant, and also wished to have an idea of the life of the silica gel. He pointed out that the furnaces with which Mr. Lewis had conducted his experiments were working with raw coal, and wondered what would be the results of the dryblast operation on modern coke furnaces. Referring to the report on blast furnace practice, Professor Desch mentioned that while American coke is not so good in quality as British coke, good results are obtained through the careful grading of coke in American blast furnace operation. Professor Harbord stated that he did not see why good results should not be obtained with methods of dry-blast operation applied to modern coke furnaces, but it all comes down to the question of cost and to how far the expenditure is justified.

E. C. Evans, of the National Federation of Iron and Steel Manufacturers, referring to the report on blast furnace practice, stated that investigations are being made on the value of coke in regard to ash content. He said that 1 per cent decrease of ash increases the value of coke by 4d per cwt. This does not take into account the increase of efficiency, economy in lime, and other factors. Referring to Mr. Lewis' paper, Mr. Evans stated that he believes there is a point of optimum dryness which should not be exceeded. T. Henry Turner, of the University of Birmingham, referring to casting of pigs in Great Britain, stated that it has been said that the market of the east coast of America is being lost to British pig iron manufacturers because the American user requires machine-cast pigs of uniform size, and British producers are not prepared to

meet this requirement. Mr. Reese replied that foundrymen should be educated to use machine-cast pigs and this would justify a large output of this kind of pig.

Replying to the discussion, Mr. Lewis stated that the silica gel which originally was put into the plant when the investigation started over two years ago still is being used. He said that some tar does get through into the gel and gives it a slight coloration, but this is easily removed by raising the activation temperature a few degrees.

The morning session ended with the presentation of a paper by W. E. Simons, of Guest, Keen & Nettlefolds' Cardiff works, describing the A.I.B. sinter plant at those works.

In the afternoon of the same day, R. H. Greaves, H. H. Abram and S. H. Rees, of the research department, Woolwich, presented a paper on "The Erosion of Guns." Following the discussion of this paper, H. Sutton, of Farnborough, Hampshire, presented a contribution on "The Influence of Pickling Operations on the Properties of Steel." Among his conclusions he stated that the brittleness produced by pickling a particular steel is, in general, greatest when the steel is in its hardest condition, and least when the steel is in its softest condition. Immersion in boiling water for 30 minutes substantially removes the brittleness due to pickling; the same result is achieved by allowing the pickled steel to stand for several days at normal temperatures.

Practically the whole morning of May 3, was taken up by presentation and discussion of the paper by Sir Charles Parsons and H. M. Duncan on "A New Method For the Production of Sound Steel." For a certain class of engineering work, exceptionally heavy ingots are needed, and where ingots exceed a certain weight, the forgings that result present certain defects which cause them to be rejected. These defects come mostly from segregation and axial unsoundness of the ingot. The authors' method of overcoming these defects is based on the principle that the freezing of the ingot should proceed from the bottom upwards. The ingots that they employ for their particular kind of work are round, and the diameter is greater than the height of the ingot. These ingots, which attain a weight of 20 tons, are poured into a mold which is constituted by a circular wall of firebricks enclosed in a strong sheet steel casing. The bottom of the mold is constituted by a chill block of cast iron or steel. The cover also is made with firebricks and contains holes through which burners can heat the inside of the mold, the center hole being used for pouring.

This paper attracted a particularly lengthy discussion, which was opened by Dr. Hatfield, of Sheffield. He pointed out that the underlying idea of the authors' method was the unidirection of freezing. He commended the authors for having evolved a novel theoretical idea, and for having carried out this idea on a large scale.

Schwab Cables His Best Wishes

CHARLES M. SCHWAB, president of the American Iron and steel institute, cabled his good wishes in the following message:

"Please convey my congratulations to your Iron and Steel institute upon its diamond jubilee, and also my good wishes to the gentlemen who have so long been identified with it. I also send you these greetings as president of the American Iron and Steel institute. Your kindly attitude to me remains a warm and happy memory, which I shall always retain. Best wishes for a delightful and successful meeting.

"I am yours sincerely,

"Charles M. Schwab."

Sir Robert Hadfield expressed considerable interest and said that he would like to know whether the authors had considered the bearing of their system on smaller sized ingots, and hoped that experiments would be continued in that direction. He pointed out that in past years considerable progress has been made in the methods of obtaining ingots, and that the qualities of ingots prepared in the ordinary way had considerably improved.

E. H. Saniter, vice president of the institute, pointed out the fact that round ingots were made long ago but that this shape was discarded because of the considerable internal stresses which developed. He said that Sir Charles Parsons partly overcame this phenomenon by heating the mold, and that the originality of the authors' method lies in the fact that the ingots they make are wider than they are high.

Professor Andrew, of the Royal Technical College, Glasgow, showed micrographs from the ingots made by the authors in those parts where segregation was noticeable, and he showed that the segregations were formed in large masses. He also pointed out that the micrographs showed indications of internal stresses. However, the micrographs had been taken from one particular ingot. Dr. Rosenhain, of the National Physical Laboratory, Teddington, thought that the good results were particularly due to the fact that it favored the elimination of gas, rather than to other factors. He suggested an alternative method based on the two following principles: (1) to use pure metal; (2) to avoid contraction by filling the mold at a rate sufficient to keep pace with the solidification. He recognized, however, that these were only principles, and that practical difficulties must be overcome.

The authors in replying to the discussion mentioned that it is a fact that heavy forgings made from large ingots prepared by the ordinary methods often present certain defects which cause them to be unhesitatingly rejected, and that engineers have been given to understand that the limit of size or weight compatible with a sound forging now has been reached.

This paper was followed by the third report on "The Heterogeneity of Steel Ingots," by a committee of the institute, which was introduced by Dr. Hatfield, president of the committee, and the various sections of the report were summarized by Dr. Andrew, Dr. Desch, and N. M. H. Lightfoot, representative authors of the sections. In view of the importance of the report and the short amount of time left, it was decided that the discussion should be done by correspondence.

Next followed "The Microstructure of Rapidly Cooled Steel," by J. M. Robertson, of London; "The Transformation of Austenite Into Martensite in an 0.8 Per Cent Carbon Steel," by Dartrey Lewis, of Bridgeport, Conn.; and "Constitutional Diagrams for Cast Irons and Quenched Steels," by A. L. Norbury, of the British Cast Iron Research Association, Birmingham.

In the afternoon the following papers were presented: "Brittleness in Mild Steel," by G. R. Bolsover, of Sheffield; "The Oxidation of Iron and Steel at High Temperatures," by L. B. Pfeil, of Swansea; "The Differential Method For Measuring the Thickness of Hard Cases Without Sectioning Them," by Edward G. Herbert and Paul Whitaker, of Manchester; "A Method For the Estimation of Hydrogen in Steel," by T. E. Rooney and Guy Barr, of the National Physical Laboratory.

Sheet Jobbers Seek Reinstatement of 2 Per Cent Discount

Metal Branch of National Hardware Association Also Favors Trade Practice Conference of Manufacturers, Jobbers and Users

COMPLEX problems confronting sheet metal jobbers and hazards of merchandising from warehouses were given a complete airing during the eighth annual meeting of the Metal Branch of the National Hardware association of the United States, which occupied the greater part of two days at Hotel Statler, Detroit, May 16 and 17. Between 150 and 200 members and guests attended.

W. H. Bowe, Herrick Co., Boston, was elected to succeed Harry L. Doten, Harry L. Doten & Sons, Boston, on the governing board for the 1929-1932 period. Karl Roth, Braden Mfg. Co., Terre Haute, Ind., was appointed to the vacancy created by the death of A. K. Raub, Raub Supply Co., Lancaster, Pa. F. M. Fuller, American Sheet & Tin Plate Co., Pittsburgh, and Robert H. Lyon, Lyon, Conklin & Co. Inc., Baltimore, retiring members of the governing board for 1926-1929, were re-elected for 1929-1932. R. W. McKewin, Farwell, Ozmun, Kirk & Co., St. Paul, was appointed to take the place of F. B. Platt of that same company on the body for the remainder of the 1927-1930 term. All other officers were re-elected.

Wants Higher Discount Rate

Major attention was paid to the unanimous desire on the part of the jobbers to have the sheet manufacturers reinstate the cash discount terms of 2 per cent for cash in 10 days, supplanting the present 0.5 per cent in force for several months. Various speakers coincided with the views of Chairman F. O. Schoedinger, F. O. Schoedinger, Columbus, O., who stated that the inauguration of the lower discount had been in itself a death blow to jobber effort and who sounded a clarion call that all warehouses show a united front and do all in their power to bring before the sheet manufacturers the absolute necessity for the resumption of the higher rate, especially on galvanized sheets. He said, "We jobbers are not asking for charity; we would not object if the additional 1½ per cent were written into quotations made to hardware jobbers and retailers by the mills and considered by them as an element of cost just the same as material, labor, overhead or freight. We believe the mills can quote different prices to different groups, where quantities and conditions differ."

The representative of Hibbard, Spencer & Bartlett, distributed copies of a questionnaire his company had prepared and had presented to various mill interests to which he had not received many satisfactory answers. It was decided that the association's secretary, George A. Fernley should send this questionnaire to each jobber in the country, in an effort to arouse widespread attention to the necessity for bringing pressure to bear upon mill interests to resume the old cash discount terms.

In his report of the trade practice conference committee, Chairman Robbert H. Lyon explained the procedure necessary for any association to adopt in order to obtain a conference with the federal trade commission. As a result of this explanation, Mr. Lyon's committee was authorized to continue its work and to request the federal trade commission to hold a trade practice conference with sheet metal manufacturers, jobbers and users, if in the opinion of the governing board of the metal branch of the association, such action should be deemed advisable.

It was the opinion of many present that expanded effort of this sort would be the only successful method of ironing out some of the existent difficulties, admitted evils and unethical practices within the industry, mill representatives present concurring with the idea.

An outline of present conditions concerning direct mill shipments was given by F. J. McNeive, W. F. Potts son & Co. Inc., Philadelphia, wherein attention was called to the increasingly competitive conditions created for the jobber by the small shipments made direct by the mills at or near prices similar to those enjoyed by the jobber himself.

Stanley A. Knisely, director of advertising and publicity for the National Association of Flat Rolled Steel Manufacturers, outlined the activities of the Sheet Steel Trade Extension committee and the good work it is doing to promote the use of sheet steel. L. D. Mercer of the Central Alloy Steel Corp., Massillon, O., and F. R. Meyer Jr. of the Inland Steel Co., Chicago, discussed "The Distribution of Sheet Steel," stating some of the difficulties and problems involved and what had been done to surmount them.

Francis O. Carfer, Republic Metalware Co., Buffalo, outlined plans for co-operative advertising by local distributors to increase the use of sheet metals. A. W. Howe, J. M. & L. A. Osborn Co., Cleveland, made it clear that only by close attention to credits through leaving irresponsible metal users unsolicited, can the jobber's expense be lowered.

Discuss Distributors' Prices

In a discussion led by W. H. Bowe, Herrick & Co., Boston, it was deemed advisable for distributors to use higher quotations for purchasers of one or two bundles of sheets than those paid by buyers of 10 or more bundles at a time and that the purchaser of 25 bundles is entitled to a better price than the one who takes only 10. Distribution of sheet copper was described by G. F. Stanton, Baltimore Copper Mills, Baltimore. Q. W. Wales, Brown-Wales Co., Boston, described how the increasing use of automobiles by salesmen had expanded hand-to-mouth buying.

It seemed to be the sense of the meeting that the production of sheet steel had been handled from a production and tonnage standpoint instead of a merchandising standpoint and that development of advertised brands would improve conditions.

Market Research Is a Requisite in Efficient Distribution

Analysis of Consumer Demands Leads to Simplification of Styles and Sizes—Business Becomes More Profitable Thereby

By H. C. Dunn

Business Specialist, Department of Commerce

PROBLEMS that seem the most disconcerting to the average business man today are problems of distribution. It may be more exact to describe them as problems of unprofitable distribution. To a neutral observer, a cross-sectional view of distribution methods and policies in general must seem to be a collection of customs and traditions. Isn't there need for simplification—simplification to those channels and practices which analysis shows to be most profitable to each institution and industry? Isn't the confusion as to what is the one best method largely caused by constant trial and error, experiments, daily opportunism—determining major policies on the basis of competitor's policies, rather than on a basis of known facts of profitableness? Isn't it the same philosophy that creates hundreds of varieties, sizes and dimensions of some commodity, the most practical uses of which are confined to only a few of those sizes and dimensions? What seems to be needed is some simple method of control—experience organized, or records that will keep the distribution simplified to the methods, volume and territories that are best suited to the circumstances and produce the required profit.

Perhaps there may be room for a new type of engineering—profit engineering. The duty of profit engineers would be:

1. Simplification, based on periodical surveys of the varieties, sizes and dimensions of products manufactured or handled; on the concentration of markets by volume and cost, the same of prospects and customers.

2. Clearing house for all data pertaining to the industry and those industries providing sources of supplies and those industries consuming the product.

ONE of the answers to profitless distribution is the concentration of effect where it produces the highest returns and out of this principle was born the idea of simplification. This was the statement made by H. C. Dunn, business specialist, department of commerce, Washington, before the joint meeting of the American Supply and Machinery Manufacturers' association, National Supply and Machinery Distributors' association and Southern Supply and Machinery Dealers' association at Atlantic City, N. J., May 7-9. In his address, an abstract of which appears on these pages, Mr. Dunn emphasized that in the last decade business has changed from a sellers' to a buyers' market, a condition which manufacturers, distributors and retailers should understand. For success, therefore, market research becomes imperative.

This information would be digested from all trade journals, convention speeches, university and government research activities and books specializing on these subjects. This would be a constant research as a regular, organized daily routine.

Analysis Is Needed

In solving problems of production, science has played an important part. Should not it do likewise for distribution? Science is organized knowledge. Organized knowledge implies research and analysis. It is this control, this scientific manipulation of what happens that makes so many happenings profitable ones for the scientifically managed institution. The unscientific manager, ignorant of the fundamental laws of cause and effect, must make his decisions on the obvious or superficial factors of his problem. The one is organized judgment, the other, snap judgment; efficiency versus habitual trial and error.

The inventory debacle of 1921 seemed to have awakened many to the need for basic facts concerning themselves, their industry, and those industries whose activities affect them—that it is an essential factor in maintaining stability. How much disaster could have been prevented had the business world known a few of the basic facts on the production of commodities, the inventories on hand and the consumption of those commodities prior to that year! Of what value would it have been to know what sizes and varieties of the various commodities the consumers were purchasing; what sizes and varieties remained as dead stock in the warehouses and on the shelves of merchants, wholesalers and manufacturers! If figures had been available showing consumers' demands decreasing with production going along at the same rate and inventories high! Suppose that together with this knowledge, manufacturer, wholesaler or merchant had a corresponding knowledge for his own institution and for his own industry.

When science is applied to the problems of distribution, it reveals that one of the answers to profitless distribution is the concentration of effect where it produces the highest returns. Out of this principle, the idea of simplification was born. When concentration on effort which produces the highest return becomes the distribution policy, then profitable business rather than volume only, becomes the measure of achievement. This is only another way of saying turnover of investment, whether that investment is in salesmen, advertising or commodities. It is the definition of ef-

ficiency—the antithesis of habitual trial and error.

When profitable application of effort becomes the rule, market research becomes a prerequisite to distribution plans. Purchasing power and consumer preferences of either actual or potential customers are not evenly distributed. A survey of the manufactures of an east central city shows that when its 474 manufacturers were classified by size, 17 or about 3½ per cent represented over 58 per cent of the purchasing power of the entire number. Fifty-seven represented 24 per cent of the total purchasing power and the balance, or 400 represented but 18 per cent altogether. Should equal sales effort be proportioned to each?

It seems more often the rule than the exception to find that 80 per cent of the business is done on 20 per cent of the varieties offered or that 80 per cent of the sales income comes from a 20 per cent of the effort applied. This disproportionment of returns on the investment seems to hold whether the subject of the analysis be an area, an industry, a manufacturer, a wholesaler or a retailer.

For example, the woven wire fence industry found it was making 552 sizes and types and combinations of gage of wire, length or roll, etc., and 2072 sizes of packages, of which 69 and 138 items respectively were found adequate to fill any consumer demand. This example represents an industry.

Let us take a manufacturer. A manufacturer of self-opening and adjustable die heads analyzed his sales and found 80 per cent of his business came from 2000 sizes or varieties, and only 20 per cent from the 53,000 others his company was prepared to furnish. Eighty per cent of his volume from 3.6 per cent of his line, only 20 per cent from the other 96.4 per cent. By concentrating his manufacturing and selling efforts on his essential lines, he reduced his inventory by $225,000, thus saving $13,500 a year in interest charges, as well as $10,000 through reduced obsolescence charges, while through the consequent reduction of clerical work, he saved $12,500 in office payroll.

Let us now take a wholesaler. A wholesale hardware merchant found he was carrying 12,000 items. Analysis revealed that 71 per cent of the total business was done from only 62 manufacturers while the 12,000 items represented the products of more than 700 manufacturers. Today, with an inventory reduced to 6500 items from 450 manufacturers, he finds that 60 per cent of his sales are the products of only 60 manufacturers. He analyzed his customers' accounts. He found there were 1432 customers on his books. When the volume of business done with each annually was measured against the volume determined upon as necessary to produce a satisfactory profit, he found that only one-half of the accounts came up to this measure. Approximately 700 of the accounts were unprofitable. The unprofitable accounts were dropped, shrinking his volume of sales 33 per cent and reducing the size of his sales territory also by 33 per cent. After a three-year operating period in the restricted area, with the reduced line, his dollar volume of net profits had increased 35 per cent; his cost of distribution was reduced from 20 to 16 per cent of his gross sales.

All Customers Not Profitable

Let us now turn to the retaining field. An analysis of toilet goods over a period of six months in a well managed city drug store of the residential type revealed that 74 per cent of the total sales were made on 139 items of 474 carried. An independent retail grocer's business, when analyzed, revealed that 20 per cent of his orders account for one-half of his business. These were the orders that amount to $4 or over. It revealed also that one-half of his business is done on five classes of merchandise—butter, bread, coffee, eggs and sugar, yet these five items require only 10 per cent of his inventory investment. This demonstrates that mark-up and profit are not twins, in fact a closer relationship is revealed between stock-turnover and profit than between mark-up and profit. It demonstrates also that all customers are not profitable.

It would seem that the difference in the two principles of distribution, which it may not be entirely erroneous to call the old style and the new, or the principle of volume versus the principle of profitable business, is clearly illustrated in the foregoing examples. It would seem to point out and confirm the value of basing distribution on scientific knowledge, rather than opinions. It would seem that the problem confronting distributors is to buy in such quantities and varieties as to provide a steady, even flow of merchandise to the consumer without building up unnecessary surplus stocks. It would seem that the problem of the manufacturer or the producer is to co-ordinate his activities to correspond. In this, probably, lies the approach to the solution of some of our distribution problems.

Manufacturer, distributor and merchant should understand thoroughly that in the last decade business in this country has changed from a seller's to a buyer's market. The consumer no longer finds it necessary simply to accept the goods which are offered him. The successful manufacturer or merchandiser will find it necessary to study the consumer demands and preferences of his particular market if he would succeed.

Obsolescence Important Factor in Determining Depreciation

DEPRECIATION with reference to cost as seen from the accountant's point of view, was discussed before 125 members and guests of the Cleveland chapter of the National Association of Cost Accountants at the regular meeting of the organization held at Allerton Hotel, Cleveland, May 15.

J. Thomas Otto, comptroller, Cincinnati Milling Machine Co., Cincinnati, as the principal speaker read a paper on "Application of Depreciation to Costs." The substance of his subject is given on page 1400 of this issue of IRON TRADE REVIEW. The topic incited considerable discussion. Thomas B. Frank, treasurer of the Cincinnati Planer Co., Cincinnati, treated the subject of depreciation from the standpoint of an executive. He believes that prevailing unethical price problems are brought about because managers of manufacturing plants do not get the proper figures from their accounting departments. They need figures that are competent, he said. Cost of acquisition alone is not enough. It must be figured on a depreciation basis. In other words depreciation costs should be included in the cost of production.

A. E. Grover, past president of the Cleveland chapter and consulting accountant for the National Machine Tool Builders Association, spoke from a public accountants angle. Accountants fall into two classes, he said; one keeps books to supply his employer with information and the other only is concerned with compiling sufficient figures to satisfy the government at the end of the year.

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Gear Manufacturers Report Further Standardization Progress

American Gear Manufacturers' Association Conducts Annual Spring Meeting in Cleveland—Many Committees Report

Problems of the Industry Discussed at Four Technical Sessions—Five Members Elected to Executive Committee

MANUFACTURE of gears to serve industry more efficiently, and solution of problems in their design comprised the important issues considered by the American Gear Manufacturers' association at its thirteenth annual convention at Hotel Statler, Cleveland, May 16-18. Little new business was introduced but continued progress in standardization was reported.

The inaugural technical session was conducted Thursday afternoon with a great part of the time consumed with routine business and reports. In the address of welcome by President A. F. Cooke, vice president and Pittsburgh manager, Gears & Forgings Inc., Pittsburgh, the gear making industry was reported to be well engaged with encouragement as to the future. One new member, the National Foundry Co., Erie, Pa., was accepted into the organization. The convention comprised four sessions, each headlined with a technical paper. Numerous committee reports were given at each session. Election of new members of the executive committee for four years was announced as follows: B. F. Waterman, Browne & Sharpe Mfg. Co., Providence, R. I., re-elected; G. L. Markland Jr., Philadelphia Gear Works, Philadelphia, re-elected; John Christensen, Cincinnati Gear Co., Cincinnati, re-elected; and W. H. Diefendorf, Diefendorf Gear Corp., Syracuse, N. Y.; E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, was elected to serve the unexpired term of Past President E. J. Frost, resigned. The executive committee will meet June 10 to elect officers.

Friday afternoon was set aside for plant visitation, a number inspecting the Cleveland works of Gears & Forgings Inc. A banquet was served in the evening.

Makes Photo-Elastic Study of Rotating Gears

STRESSES determined photo-elastically were shown in motion pictures used to illustrate a paper, "Load and Stress Cycles in Gear Teeth," read by R. V. Baud, Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., at the opening session. In preparing this paper Mr. Baud collaborated with R. E. Peterson of the same organization. This unique device showing where the varying degrees of stress occur as meshed gears rotate caused considerable comment.

Three sets of 10 diametral pitch gears, all of 1 to 1 ratio, having 20, 35 and 75 teeth, corresponding to 1.68, 2.08, and 2.32 contact ratio respectively, were studied in this investigation. The stresses were determined photo-elastically because the problem involves several factors which cannot be determined analytically. As a result of these tests, it may be concluded that increasing the contact ratio produces more favorable load and stress cycles.

When more than one tooth of a gear is in contact, the load is in general not divided equally among the teeth but the actual load division depends on the deflections of the teeth, Mr. Baud brought out. This paper proved unusually interesting.

A paper dealing with the recent developments in the manufacture of large bevel and hypoid gears was presented by Allan H. Candee, mechanical engineer, Gleason Works, Rochester, N. Y., Thursday evening. A number of slides were shown. The paper covered a discussion on large bevel gears of greatly improved running qualities due to generating instead of planing the teeth, and the use of spiral teeth instead of straight teeth.

Describes Gear Generation

The author described in detail a new type of large bevel-gear generating machine designed by the Gleason company with which, by a unique combination of mechanical movements, spiral teeth are produced. In addition Mr. Candee explained the accurate generation of large hypoid gears in which the axis of the pinion is offset from the axis of the gear, thus making it possible for the two shafts to continue past each other. Mr. Candee said in part:

"Machines for cutting teeth in bevel gears are divided into two general types, usually called planers and generators, in which the tooth-profile shapes are produced by entirely different methods. The planers were the earlier type to be developed. In them the profile shape is obtained from a former or templet by a direct copying method, and is planed out by the small rounded point of a single tool. The results obtained in the finished gears depend to a large degree upon the human skill involved in making and using the former and in adjusting the tool.

"In generating machines, which were a later development, the profile curves on the sides of the teeth are produced by the relative motion in the machines between the tools and the gear blank, the cutting being done by the straight-edged sides of the tools. This method is easily understood by thinking of the cutting edge of the tool as lying in the side of a crown-gear tooth, and real-

izing that the relative motion required is the same as would occur if this crown gear were to roll in engagement with the gear being cut.

"Straight-tooth bevel gears are cut by both methods by reciprocating the tools in straight lines directed to the cone apex. In the Gleason spiral-bevel-gear generator, a circular rotating cutter is substituted for the straight-line reciprocating tools to produce spiral bevel gears, or gears with curved and oblique teeth. Usually the tools work on one tooth at a time, and when that is finished the blank is indexed for the next tooth.

"Considered on the same basis of smooth and quiet running, generated spiral bevel gears are superior to generated straight-tooth bevel gears. The principal reason for this is that the inclination, or spiral angle, causes the spiral tooth to take up the load gradually, whereas the straight tooth comes into contact instantaneously throughout its length. Also, the spiral tooth remains in contact longer, giving a higher value for the average number of teeth in contact. There is usually continuous pitch-line contact. For these and other reasons spiral teeth are easier to make quiet-running than straight teeth.

Cutting Method Explained

"In the method of cutting hypoid gears developed at the Gleason Works, the larger member of a pair is generated as a true bevel gear on a standard bevel-gear generator. Then the pinion is generated in a machine of similar type but provided with vertical adjustment of the work spindle above and below center. Generally, for one side of the teeth the offset when cutting is slightly more than the offset when running, and for the other side, slightly less. This vertical offset of the pinion blank above or below center in the machine constitutes the principal difference between the cutting of hypoid and true bevel pinions. For generating large hypoid pinions, some of the planing-generator machines previously described have been equipped with special hypoid work heads.

"Hypoid gears possess all the good features of spiral bevel gears and have in addition other advantages due to the offset. Being an intermediate type, hypoids combine with the smooth rolling action of spiral bevel gears some of the smooth sliding action of worms. The amount of endwise sliding between the teeth introduced by the offset, in designs so far used, is only about one-quarter of the amount which occurs in a worm drive with a 45-degree helix angle. This additional sliding action in hypoid teeth is not enough to have any appreciable effect on wear. In correctly designed and properly mounted and lubricated hypoid gears, as in spiral bevel gears, tooth wear is practically negligible."

Knowledge of Production Costs Must Be Exact

AN ADDRESS, on "Knowing Your Costs," given by Louis G. Goetz, manager factory system department, Nau Taylor & Swearingen, Cleveland, commanded interest at the Friday morning session. Much information on this important phase of business and industry was imparted by the speaker. Arriving at the basic fundamentals, Mr. Goetz said:

"What then are the elements of cost? What is the information which the cost department in an industrial gear plant should be able to present? In what form should it be available, and how should it be used in compiling estimates?

"The elements entering into the manufacturing cost of any gear are three, namely: Raw materials; direct labor; indirect expense, variously known as burden or overhead.

"By raw material is meant that material which is to be processed to produce the finished product. In the case of gears it is usually steel, iron, brass, bronze, fiber or rawhide, in the shape of bars, forgings, castings, and molded or formed blanks. In any case, it can be identified as composing the finished product.

Price Cutting Is Hurtful

"Too often the price, in order to get the business, is cut too far. This not only causes a loss to the plant which is awarded the work, but it tends to demoralize the whole industry because it establishes a lower level of prices generally, and this in turn, causes extreme sales resistance to develop as soon as any attempt is made to get prices in the industry back to a profitable level.

"It may be necessary at times to take business at less than a satisfactory profit, or even at no profit, but whenever such an occasion does arise, whatever decision is made should be based on the facts of performance.

"The more exact knowledge he has concerning his cost and the better he understands how to apply this knowledge to his manufacturing and executive problems, the greater will be his advantage over less fortunate competitors, the more stabilizing will his firm's influence be in the industry and the more serviceable will he be to his stockholders whose money he is endeavoring to turn over at a profit. der such conditions, knowledge is indeed power."

As a conclusion to the convention, Mr. Candee presented another paper Saturday morning, this time on the subject, "Gear Geometry." Mr. Candee had taken an active part in the discussion of the progress report for involute external helical and herringbone gear nomenclature given by D. T. Hamilton, Fellows Gear Shaper Co., Springfield, Vt., Thursday evening.

Introducing his paper, Mr. Candee explained that a clear and accurate understanding of the elements involved is indispensible to all who deal with the design, dimensioning, cutting, and measurement of gear teeth. The accurate exchange of ideas requires the exact definition and use of terms. The information was collected and arranged for the paper, Mr. Candee said, with the idea of making the important geometrical relationships as easy to see as possible, with the intention of providing a sound basis for a thoroughly logical and comprehensive system of gear geometry.

Committees reporting announced favorable progress. A. A. Ross, General Electric Co., Schenectady, N. Y., chairman of the herringbone gear committee, submitted a progress report to be modified as the art develops. A herringbone gear, according to the report, is a double helical gear, the helical angles of which are opposed. Diametral pitch and tooth proportion shall be known, referred to and calculated on the basis of diametral pitch in plane of rotation. For instance, if the teeth are cut with a standard spur gear hob, the resulting fractional diametral pitch and pressure angle in plane of rotation shall be referred to, and quoted without any reference to tooth proportions on the normal section.

Make Changes in Nomenclature

Suggested changes were made here and there in the involute external helical and herringbone gear nomenclature as it was being submitted by D. T. Hamilton, chairman of the committee. He stated that as soon as the revision is completed the committee will go on with the sketches and formulas. It expects to present it complete at the next meeting.

W. H. Himes, Westinghouse Electric Co., East Pittsburgh, Pa., in reporting for the worm gear committee, said he had received no criticism on the recommended practice of that committee. In the discussion of worm gears, President Cooke stated that practically no data on safe loading of worm gears are available. Mr. Himes said the only way to arrive at reliable data is to make tests. Further discussion disclosed that research will doubtlessly start in this field with members of the association co-operating. The non-metallic gearing committee reported that claims of materials are being maintained by tests being run due to their flexibility.

Proper Machine Tool Depreciation Rate Is Important Factor

Deterioration, Wear and Tear, Obsolescence and Inadequacy Necessitate Allowance for the Replacement of Equipment

By J. Thomas Otto

Comptroller, Cincinnati Milling Machine Co.

DEPRECIATION and burden rates on plant equipment must be calculated on current price values and not on cost of acquisition, if provision is to be made for replacement of assets. This was the advice of J. Thomas Otto, comptroller, Cincinnati Milling Machine Co., Cincinnati, to members of the Cleveland chapter of the National Association of Cost Accountants on May 15. The title of Mr. Otto's address was "Application of Depreciation to Costs," and in it he warned that any business expecting to prosper and grow much figure its costs and depreciation on a sound basis.

DEPRECIATION is considered to be the financial effect of deterioration, wear and tear, obsolescence, and inadequacy. It is charged off to cost in order to establish on the books of account an allowance or reserve for the purpose of replacement of equipment when it has become worn out, obsolete, or inadequate for future use.

The first step, of course, is to determine a proper rate to be used. This rate is governed by the estimated life of the equipment. Once the probable life of the equipment is decided upon the next step is to determine its value. It is common practice among a great many companies to assume that the cost of acquisition is a figure which must be given precedence over good judgment, even though the use of the acquisition cost will set up on the books a fictitious story. Management should attempt to secure a true picture of depreciation rather than to adhere to old policies, misguided conceptions or a rule of thumb followed by the accounting profession. Our position as accountants to the firms employing us demands that we present facts in such a way as to present this true picture to the manager.

Problems Become Complicated

Let us imagine a business that has been in existence for over 40 years. Like most concerns it has acquired a certain amount of machinery from time to time to supply added production needs and to replace worn out equipment. It suddenly discovers that the present plant capacity is inadequate and, due to the addition of certain lines of products, its production problems have become complicated. The company decides to separate the two most oustanding product lines that it handles and, in pursuance of this policy, the management acquires a new building, installs new equipment, and physically separates the manufacture of one line of product from its other line or lines.

We will assume that the company has always used cost of acquisition in figuring its depreciation and in establishing its departmental burden rates. The same policy will, of course, apply in the new plant when it comes into being and so they proceed to establish their burden rates. Depreciation, interest, taxes, and insurance are included as items of cost. What is going to be the result of this policy? Cost of equipment purchased years ago for the old plant will be low as compared with the cost of similar equipment purchased today for the new plant. The cost of equipment purchased for the new plant probably will be between 50 and 100 per cent more than the equipment in the old plant. Burden rates established on the basis of cost of acquisition will have the effect of showing that the old plant can produce far more cheaply than the new one, which, if the new plant has been properly designed, will be the reverse of the truth.

If the company has set aside reserves sufficient to provide for the replacement of its assets on the basis of their first cost, or as it should be stated, if the company has not collected from its customers through the sale of its product a sufficient amount to replace its assets at the cost obtaining at the time of replacement and thus continue in business, what is to be done? Of course you might answer as one man did: "Well, in that case ask the stockholders to provide additional funds in order to permit the replacement of the equipment." But, I ask you, if owning stock in a corporation, how would you feel if asked, at the end of 10 years, to pay an assessment of $5000 or $10,000 in order to save your original investment? You would probably criticize the management adversely for having failed to provide safeguards necessary to enable it to replace the equipment without additional investment on your part.

Revaluation of Assets Required

The only means the management has of getting costs in the two plants on a comparable basis is to bring the value of all of its equipment up to current price levels. Of course, this means a revaluation of assets on their present day worth, and the figuring of depreciation and burden rates on the new values. This will then permit the reflection of the actual and true current costs of production. The cost of the wasting and use of plant assets will be measured by present values. Selling prices then may be based on cost computations which present a continuous and true picture of actual present-day costs and thereby, at all times, assure the business

of an adequate profit over and above the actual requirements of plant replacements and continuation. Any business that expects to prosper and grow must make such provisions to assure its customers of its continuation in business.

Let us look at the insurance phase of this matter of depreciation. Insurance is taken out to protect capital invested in insurable assets in case those assets are suddenly destroyed or damaged by fire. Insurance is a business contract providing for the payment of a specified premium by the party insured in return for which the insurance company agrees to pay over to the insured a certain sum of money provided certain losses occur due to fire, tornado, etc. The contract does not recognize the cost of acquisition of the assets which are destroyed by fire and are the property of the insured. Settlement is made upon the basis of what it would cost to go out in the open market and replace the destroyed assets allowing for an estimated amount of depreciation. The insurance company is not interested in the original cost. In fact, it does not care whether its cost was above or below present day values. Of course, it would be extremely foolish for a company to insure its assets beyond their present day values and expect to collect that amount.

If it is good policy to insure equipment against loss by fire at replacement value, by what right or reasoning can you argue that it is unfair, illogical, or a foolish theory to figure depreciation on replacement value? The fire hazard, of course, is sudden and unexpected. Depreciation assumes a slow wasting of assets. But loss sustained by depreciation is just as sure and just as costly as loss by fire. The writer cannot conceive of the reasoning that prompts accountants to oppose, today, depreciation on replacement value and tomorrow put in a day's time figuring the cost of reproduction value in order that they may be assured that their company is adequately protected with insurance.

No better illustration of the logic of this entire discussion can be found than to consider the practice of accounting for original cost only, in its relation to matter of insurance. H. G. Baldwin in his book "Accounting for Value as Well as Cost of Fixed Assets" says, "If original cost is capital and if its recovery will prevent any impairment in the capital funds of the enterprise, why in all reason do we insure properties on the basis of current values? Why add the additional cost of premium for the insurance of value to our already burdensome cost of production? If the principle of recovering only the loss of original cost of property exhausted in production is sound, why is it not sound in recovering loss by fire and why is it not followed by accountancy and business?"

If the same principle of recovering only original cost was followed when insuring property, plants would be insured, when built on the basis of their original cost, and subsequent loss realized through increase of values in the event of fire would be met out of surplus, or according to other ideas, new funds would be brought into the business to rebuild the plant. Loss of values involved could be ignored because the proprietors would have recovered their original investment and this, according to proponents of original cost, is all they can reasonably expect to recover, that if they do recover it, there will have been no impairment in the capital fund of the enterprise.

Economic Effects Disregarded

It is unfortunate indeed that a great many accountants today are concerned only in establishing accounting figures without regard to the economic effects that are going on at the same time. Modern business demands that the accountant present not only facts, but a relationship of facts which will form a base for, and force correct managerial decisions. When depreciation is not figured on replacement value, the accountant is not presenting a true picture and management, in its turn, is making decisions without knowledge of facts.

How would you go about establishing the necessary machinery or system to secure figures necessary to ascertain depreciation on replacement value? Briefly the procedure should be as follows:

1. Secure a list of all equipment grouped according to the various classifications shown on your books under the heading of equipment. This list should show date of acquisition, size and style, manufacturer's name and purchase price.

2. Turn this list over to your plant engineer or purchasing agent with the request that he get in touch with the local office of some machinery agent and secure present day prices on this equipment.

3. Having secured this information determine what is going to be the life of your machine tools or other equipment in order to arrive at a correct and profitable rate of depreciation. Do not set these rates with the idea that 10 per cent depreciation on machine tools is too high because you will be unable to show a profit at the end of the year. If you intend to be a leader in your industry you should expect to keep up with new methods and expect to replace your equipment, and move rapidly in order to produce better product at less cost.

4. Now you are ready to figure your depreciation, having ascertained the depreciation figure on replacement value. Also figure depreciation on original cost.

Your journal entry will be as follows:

Debit—Expense depreciation on production cost with total amount of depreciation figured on replacement value.

Credit—Depreciation reserve, amount of depreciation on cost value.

Credit—Difference in depreciation figured on cost of acquisition, and amount figured on replacement value to depreciation adjustment accounts.

It is to be seen that this is not a complicated problem. But let us examine this item again from a cost standpoint or in the light that an engineer would view it.

Here is a milling machine bought in 1910 at a cost of $2000. Alongside this machine is another miller bought in 1929 at a cost of $4000, both machines being the same in style and capacity. Depreciation is assumed to be 10 per cent per year. On machine No. 1 depreciation is $200, and on machine No. 2, $400.

These machines operate 400 hours a year. Cost per hour on machine No. 1 is 50 cents and on machine No. 2, $1. Viewing this problem as a matter of managerial decision only, that is, whether to buy a new machine or not, the answer would be no. Why? because like comparisons have not been made. It has been figured purely on a dollar book value without taking into account the economic effect that has transpired.

Aluminum Output Gains

New aluminum produced in the United States in 1928 was valued at $47,899,000, an increase of 22 per cent over 1927, according to the bureau of mines, department of commerce, Washington. Aluminum metals, scrap and alloys imported in 1928 totaled 37,895,832 pounds valued at $7,736,412. This was a reduction of almost half from the 72,188,518 pounds, valued at $15,315,571 imported in 1927. Exports of aluminum showed little change from 1927, the chief item in 1928 being 13,337,783 pounds of plates, sheets, bars, strip and rods, valued at $3,314,833.

Mechanical Engineers Hold Spring Meeting in Rochester

Devote Considerable Time To Influence of Tungsten-Carbide Cutting Tools on Design of Machinery

Other Sessions on Education, Apprentice Training, Power Transmission and Materials Handling

NEARLY 600 members and guests of the American Society of Mechanical Engineers met May 13-16, at Rochester, N. Y., for the annual spring meeting of the society. Simultaneous technical sessions were held as part of the full four-day program. The sessions covering technical education and machine shop practice were especially noteworthy, the discussion on tungsten carbide cutting alloys extending overtime. These new materials forecast a revolutionary change in machine design and in metal cutting.

Our technical schools of the noncollege type are poor when compared with European schools of the same class, said W. E. Wickenden, newly elected president of the Case School of Applied Science, Cleveland, in a forceful analysis of educational requirements here and abroad, presented on the opening day.

Elmer A. Sperry, chairman, Sperry Gyroscope Co., New York, and president of the society, presided at various meetings of the executive committee. The nominating committee met but made no announcements. Detroit was unofficially selected for the place of the next spring convention of the society.

New Tungsten Alloys Challenge Tool Builders

ALTHOUGH tungsten carbide alloys have been much heralded, there was a new note of importance in the discussion at Rochester. Tool builders and users alike seemed to have accepted as fact that sweeping changes in tool design are imminent.

The importance of the tungsten-carbide alloys to the foundry industry was stressed by one speaker in the machine shop practice sessions. Castings, although desirable as machine parts, sometimes have been discarded because of machining difficulties. Now, through the use of tungsten-carbide tools machining problems are readily solved and frequently the use of castings has again become advantageous.

Sessions under the auspices of the machine shop practice division were held Tuesday and Wednesday. The discussion of tungsten-carbide alloys was one of the most lively of the convention. In the opinion of Erik Oberg, editor, *Machinery*, New York, and chairman of the session, these new tool materials represent the most significant development in the entire history of the machine tool industry.

A report on investigations of tungsten-carbide cutting alloys made by the General Motors Corp. was presented by W. Paul Eddy Jr., assistant metallurgist, of that corporation at Syracuse. The report which was prepared jointly by Mr. Eddy and H. J. Long, chief experimental engineer, Brown-Lipe-Chapin division, General Motors Corp., Syracuse, covered a long series of tests on actual operation where tungsten-carbide cutting tools were substituted for high speed steel and stellite. In many cases, no other changes were made, that is, the speed and feed were kept the same, the chief feature of the investigation being the life of the tool. Mr. Eddy told of a case in the machining of malleable iron where the best previous practice with high-duty tools had given a tool life of 200 pieces. The tungsten-carbide tool under exactly similar conditions gave a tool life of 7000 pieces.

Report Details Procedure

The report contained a large amount of valuable detailed information. It described the method of cutting off pieces of the tungsten-carbide alloy bar for making up the tools, and it described methods of sharpening the new tools and gave some suggestions as to their design. Mr. Eddy said that they found that a much broader nose could be used with the tungsten-alloy tool than with high-speed steel, because any additional heating effect on the tool did not interfere with the cutting action of the alloy. He said it was their practice to purchase the alloy in bars with the cross section fitting the tool requirements and then to cut off small pieces of the bar as needed. This, of course, meant a different sized bar for each series of tool sizes.

He said they had tried all sort of methods of cutting off the bars, and found the best was to use a thin abrasive disk and start from one side and continue cutting until the fracture occured. For this he said they used a 7-inch abrasive wheel, ⅜-inch thick with a thin cutting fin on its outer edge. For sharpening tungsten-carbide tools he recommended an aluminum disk using silicon carbide powder as the abrasive material.

In the discussion following Mr. Eddy's presentation many cases of exceptionally long life for the tungsten-carbide tools under severe conditions were cited. Frank C. Spencer, assistant superintendent, machinery pro-

curement, Western Electric Co., Kearny, N. J., who presented the report of the subcommittee on machinability covering this same subject, told of a case where malleable iron with brass inserts was machined with difficulty on account of short life of the tool. He said with the best high-speed steel a life of from 3 to 8 hours had been secured, and that by changing to a tungsten-carbide tool, with other conditions the same, a life of 6 weeks under normal operation had resulted.

Several Alloys Available

Mr. Spencer's report stated that at present there are two tungsten-carbide products available in the United States, carboloy, manufactured and sold by the Carboloy Co., New York, and widia, manufactured by the Krupp Co., Essen, Germany, and imported by Thomas Prosser & Sons, New York. The Wesson Sales Co., Detroit and Chicago, acts as sales agent for widia in western territory. In addition to these two brands, Mr. Spencer mentioned strauss metal and dimondite. Strauss metal is the trade name of the product of the Ludlum Steel Co., Watervliet, N. Y. The Ludlum Steel Co. is building a new plant for the manufacture of this alloy and is expected to get into production later this year. Dimondite is the trade name of the tungsten-carbide alloy which is to be manufactured by the Firth-Sterling Steel Co., McKeesport, Pa. The discussion covering Mr. Spencer's report developed the fact that the Cleveland Automatic Machine Co., Cleveland, had brought out a new tungsten-carbide cutting alloy.

It was the general opinion that there is now a need for a new alloy combining the hardness of the present tungsten-carbide group with tougher qualities permitting heavier cuts and greater resistance to shock or vibration. Even without any further development, the present tungsten-carbide tools call for a veritable revolution in the design and construction of machine tools. E. F. Du Brul, general manager, National Machine Tool Builders' association, Cincinnati, said that to realize quickly the full benefit of the new alloys a great research campaign should be started at once. He advised the raising of a fund of $500,000 to build machines which would far exceed the limits of the best tool material now known, and to make exhaustive tests which are impossible with present equipment. However, he feels encouraged because the country now is better equipped to make use of the tremendous possibilities of the tungsten-carbide alloys than it was to take advantage of the development of high-speed steel 30 years ago.

The metalworking industry represents a tremendous proportion of all manufacturing in this country, according to Mr. Du Brul, who endeavored to give an adequate picture of the new possibilities and of the sweeping changes which are not far ahead in the machine tool industry. Mr. Oberg added that we do not know what is coming in the art of cutting of metals, but we feel we are on the edge of a big new development.

The use of diamonds as metal cutting tools was described in a paper by C. L. Bausch, manager, research and engineering, Bausch & Lomb Optical Co., Rochester. Diamonds as cutting tools, he said, are particularly adapted to machining nonferrous metals. His company uses diamonds successfully for both roughing and finishing cuts and is able thereby to produce mirror-like surfaces which cannot be duplicated with steel cutting tools. He described the method of mounting and shaping diamonds.

Cutting with Diamonds

Diamonds, he said, are used extensively where the material to be machined is too hard for a steel tool. With proper care in selecting, cutting and mounting diamonds, their life as tools for machining metal should be great. He cited one case where a turning tool was used to produce 15,000 pieces before sharpening. In the discussion following this paper H. J. White, Gleason Works, Rochester, asked about the difficulty with vibration, and Mr. Bausch replied that they had been able to use diamonds at almost any desired cutting speed providing the machine tool was sufficiently rigid to avoid vibration. But he admitted the difficulty of using diamonds where vibration existed. He told of an alloy of tantalum which is claimed to be about as hard as diamonds and less brittle.

Machinery Drive Frequently Is Too Powerful

POWER transmission equipment often is overlooked in the search to reduce waste and increase production in a manufacturing plant, according to W. W. Nichols, vice president and mechanical engineer, D. P. Brown & Co., Detroit, who presented an illustrated paper on economy in power transmission. He cited many cases where machine tools and other equipment are operated by too large motors, resulting in poor power factor and high cost for electric energy. He said it was common practice in most shops to connect a motor to a machine and to let the two run together regardless of the work which was being machined. In good practice he said, whenever an operation is changed the motor also should be changed, or at least checked to see if it is the right size.

He described portable testing equipment with which to determine the horsepower of any operation and by means of this he said he had gone through shops changing to smaller belts and reducing motor sizes. He said after one test he changed a 5-inch belt to a 2-inch belt despite opposition, but the 2-inch belt is still operating successfully. If users of machine tools would co-operate more closely with the manufacturers more suitable motors would be used in many cases, he felt. If the buyer does not specify the nature of the work to be done by a machine, the manufacturer has no alternative but to put on a large motor to take care of any exigency. Another difficulty is encountered with the electric wiring regulations which call for certain sized fuses with certain sized motors.

A. H. Candee, mechanical engineer, Gleason works, Rochester, described a new type of large hypoid gear in which the axis of the pinion is offset from the axis of the gear, thus making it possible for the two shafts to continue past each other. This new gear is cut on a generating machine of special design developed for the purpose, and because of the use of spiral teeth instead of straight teeth and of other features, it has unusually smooth running qualities. Some details of the new gear are given in the report of the Cleveland meeting of the American Gear Manufacturers' association on page 1398 of this issue of IRON TRADE REVIEW. F. A. Parsons, engineer, Kearney & Trecker Corp., West Allis, Wis., asked about the wearing qualities of these new gears, and Mr. Candee said that he felt a slight slide between gears was an advantage as it helped to maintain the oil film and also facilitated lapping.

He pointed out that the new hypoid

(*Concluded on Page* 1406)

Proposes Code for Gas Welding and Cutting of Structural Steel

American Welding Society Formulates Complete Specifications To Provide Safe Welded Construction—Codes on Piping and Tankage To Follow

INCREASE in the use of welding and gas cutting in the construction and equipment of buildings has brought to the American Welding society a number of requests from municipal and other authorities for assistance in the formulation of regulations in the revision of existing building codes and the compilation of new codes where none is now in force, which will insure the safe and satisfactory use of the processes in the fabrication and erection of structural steel, piping and tankage in building construction.

In response to these requests, the American Welding society through a special committee has prepared recommended practices in the application of fusion welding and gas cutting to structural steel. These specifications, which appear in full on these pages, have been formally approved by the society. They have been arranged that they may be embodied wholly or in part in existing municipal or other building codes and care has been taken to be conservative in the formulation of the code. The various regulations are based on practices which have been demonstrated to be safe by experience, covering many full-size destructive tests and numerous welded building structures erected throughout the country.

Being the first edition, this code has been made as simple and as devoid of details as possible. The committee, is prepared, however, to assist in the interpretation of the code or its applications.

Section 1. General Application

1. Fusion welding may be substituted for or used in combination with the riveting, bolting or other requirements already prescribed in the building code of the City of .....; hereinafter called the "Building Code," for connecting together, or assembling the component parts of, steel beams, girders, lintels, trusses, columns and other structural steel used in building construction; provided that the welding be done in accordance with Sections 3 to 7, inclusive, of this code.

2. Gas cutting may be substituted for shearing or sawing in the fabrication of structural steel members or parts, used in building construction, provided the cutting be done in accordance with Section 8 of this code.

Section 2. Definitions

The definitions of welding terms, as approved and published by the American Welding society, shall govern for any welding terms appearing in this code.

For convenience, some of the more common terms have been included herein, and their specific applications under this code are defined as follows:

1. *Fusion Welding*—The process of joining metal parts in the molten, or molten and vapor states, without the application of mechanical pressure or blows.

Under this code, fusion welding is restricted to the arc and gas welding processes.

2. *Root*—The zone at the bottom of the cross-sectional space provided to contain a fusion weld.

3. *Throat*—The minimum thickness of a weld along a straight line passing through the root.

Under this code the throat of a fillet weld shall be the distance along a line from the root to the hypotenuse at right angles thereto, of the largest isosceles right triangle that can be constructed in the cross-section of the fillet weld; and the throat of a butt weld shall be equal to the thickness of the thinner part joined.

4. *Fillet Weld*—A weld of approximately triangular cross-section whose throat lies in a plane disposed approximately 45 degrees with respect to the surfaces of the parts joined.

The *size of a fillet weld* shall be expressed in terms of the width in inches of its adjacent fused sides.

5. *Butt Weld*—A weld whose throat lies in a plane disposed approximately 90 degrees with respect to the surfaces of at least one of the parts joined.

The *size of a butt weld* shall be expressed in terms of its net or unreinforced throat dimension in inches.

6. *Weld Length*—The length of a weld shall be considered to be the unbroken length of the full cross-section of the weld exclusive of the length of any craters.

7. *Weld Dimensions*—Under this code the dimensions of a weld shall be expressed in terms of its size and length.

8. *Gas Cutting*—The process of severing ferrous metals by means of the chemical behavior of oxygen, in the presence of ferrous metals at high temperatures, to produce a kerf or cut of uniform width without burning the edges of the kerf or cut.

Section 3. Materials

1. The grade of structural steel to be used under this code shall be that already prescribed in the building code.

2. The electrodes, welding wire and/or welding rods, shall either be one of the grades specified by the American Bureau of Welding in its Bulletin No. 2, or some equally good grade which, in the hands of an experienced welder, shows good weldability in flat, vertical and overhead positions. In the discretion of the superintendent of buildings it may be required to show the strength specified in paragraphs c and g, Section B, of the American Bureau of Welding Specifications.

Section 4. Permissible Unit Stresses

1. Welded joints shall be proportioned so that the loads specified in the building code shall not cause stresses therin to exceed the following amounts in pounds per square inch:

Shear on section through throat of weld	11,300
Tension on section through throat of weld	13,000
Compression on section through throat of weld	15,000

Maximum fibre stresses due to bending shall not exceed the values prescribed above for tension and compression respectively.

2. In designing welded joints adequate provision shall be made for bending stresses due to eccentricity, if any, in the disposition or section of base metal parts.

Section 5. Design

1. The architect or engineer designing or supervising a welded structure shall be experienced and skilled in such work.

2. *Plate Girders*—Girders shall be proportioned either by their moments of inertia or by the flange area method. In applying the flange area method to welded girders having no holes in the web, one-sixth of the web area may be considered a part of each flange area.

Stiffeners may be either angles or flat bars, welded to the top and bottom flanges, and to the web, by continuous or intermittent fillet welds

designed to transmit the stresses.

Connection of component parts of flanges to each other and of flanges to web shall be by continuous or intermittent fillet welds designed to transmit the stress.

3. *Beams*—The use of continuous beams and girders, designed in accordance with accepted engineering principles, shall be permitted provided that their welded connections be designed to transmit the stresses to which they may be subjected.

The connections at the ends of noncontinuous beams shall be designed so as to avoid excessive secondary stresses due to bending.

4. *Columns*—Fillet welds connecting the component parts of a built-up column may be either continuous or intermittent, the length of each weld at the ends of the column shall be equal to the least width of the column. The length of the intervening welds shall be not less than 1½ inches, spaced not more than 4 inches in the clear. The size, length and spacing of the fillet welds shall be such as to provide the same strength, per unit of column length, as the rivets specified elsewhere in the building code.

Lattice bars and tie plates, if used, shall be welded so as to secure strengths equal to those of the rivets specified therefore elsewhere in the building code.

5. *Butt Joints*—The edges of base metal parts, ¼ inch or more in thickness, transmitting stress by means of butt welds shall be beveled. For single and double vee joints, the bevel of each part shall be not less than 30 degrees, thus forming an open space with an angle of not less than 60 degrees. For single and double bevel joints, the bevel shall be not less than 45 degrees.

Before welding, the root edge or face of one part shall be separated from the root edge or face of the other part by the spacing given for butt joints on pages 22 to 28 inclusive, of Section E of American Bureau of Welding Specifications.

All butt welds shall be reinforced by depositing additional metal on the weld to a height extending beyond the surface of the thinnest part joined. The height of said reinforcement shall be not less than the following per centage of the thickness of the thinnest part joined:—20 per cent for single vee and single bevel butt welds, and 12½ per cent, on each side, for double vee and double bevel butt welds.

Section 6. Workmanship

1. Contractors for welded structures shall be required to satisfy the superintendent of buildings as to their ability to produce satisfactory welded joints of the forms specified, and with the process (arc or gas), materials and equipment to be used on the proposed work.

2. The quality of welds permitted under this code shall conform to the practice recommended in Section D of the American Bureau of Welding Specifications.

3. Surfaces to be welded shall be free from loose mill scale, rust, paint or other foreign matter. A thin coat of linseed oil or equivalent, over the surfaces to be welded, need not be removed. This provision applies both in the case of new structures and where new steel is to be welded to steel in an existing structure.

4. In assembling and during welding, the component parts of a built-up member shall be held by sufficient clamps, or other adequate means, to hold the parts in proper relation for welding.

Section 7. Erection

1. Structural steel parts shall not be painted before they are welded. Parts that are welded in the shop, to be erected by bolts or rivets, shall receive the usual painting after the shop welding is finished. Parts to be field welded shall receive a coat of linseed oil after shop work is completed, and after erection and field welding, they shall receive as many coats of paint as the total number specified elsewhere in the building code for shop and field painting.

2. For all welded structures over 30 feet in height, erection bolts, or equivalent means shall be employed for temporarily supporting the members and for insuring proper alignment.

Section 8. Gas Cutting

1. The contractor shall be required to satisfy the superintendent of buildings as to his ability to produce satisfactory gas cuts.

2. Gas cut edges shall be smooth and regular in contour.

3. Gas cutting may be used in the preparation of base metal parts for welding, providing the edges so cut are thoroughly cleaned after cutting so as to expose clean steel.

4. Gas cutting shall not be permitted to replace the milling of surfaces specified elsewhere in the building code.

5. Gas cutting shall not be permitted on any member while it is carrying stress. This restriction shall not apply to detail cutting for the correction of minor fabricating errors, where the removal of metal resulting from such gas cutting would not reduce the required strength of the member that is to be cut.

6. Gas cutting of holes in a member which has not been designed therefore shall not be permitted.

First Code Introduced

THE accompanying specifications constitute the first authoritative structural steel welding code to be promulgated. They have just been approved and announced as "Part A, American Welding Society Code for Fusion Welding and Gas Cutting of Structural Steel." Printed copies of the code may be obtained from the American Welding society, 33 West Thirty-ninth street, New York, for 25 cents each. Codes dealing with fusion welding and gas cutting, as applied, respectively, to piping and tankage in buildings, are being prepared and will appear in Parts B and C. Other codes will be undertaken as the need for them arises. It is the purpose of these codes to serve and assist in providing safe welded construction and to aid municipal and other authorities responsible for the preparation and enforcement of general building codes in the regulation of construction welding. Composing the Welding society committee on building codes are: E. A. Doyle, Linde Air Products Co.; J. L. Anderson, Air Reduction Sales Co.; Gilbert D. Fish, Westinghouse Electric & Mfg. Co.; F. T. Llewellyn, United States Steel Corp.; F. P. McKibben, General Electric Co.; H. H. Moss, Linde Air Products Co.; James W. Owens, Newport News Shipbuilding & Dry Dock Co.; and Edmund Vom Steeg, General Electric Co.

To Study Heat Transfer

The efficiency of a number of industrial processes, such as the blast furnace, gas producer, and lime kiln, depends upon the proper transfer of heat from moving gases to colder solid particles. In general, heat transmission is a function of the physical properties of the mass of solid particles.

The North Central experiment station of the bureau of mines, in cooperation with the University of Minnesota, Minneapolis, has started an investigation for obtaining quantitative information which will guide operators in making such innovations in practice as will best satisfy the thermal requirements of their processes. Proper transfer of heat is particularly important in the blast furnace as the rate of reduction of the ore depends upon the temperature of the ore mass.

The transmission of heat from water flowing through a bed of steel balls about 1-inch diameter is being studied first with a view of finding some fundamental relations that can be applied to systems in which heated gases are passed through a mass of irregular-shaped particles of relatively low heat conductivity.

Several new features will be incorporated in two steam turbine generators which are to be added to the generating facilities of the Pacific Gas & Electric Co., San Francisco. The two machines, built by the General Electric Co., Schenectady, and each rated at 50,000-kilowatts, will be the first of the new "double-deck compound" type, will be the first high-pressure turbines on the Pacific Coast, and will be fueled with natural gas piped 240 miles.

Machinery Drive Often Is Too Powerful

(*Concluded from Page* 1404)

gears completed the gear series. Heretofore, he said, gears have been produced with intersecting axes or with axes that are parallel. Now he said the hypoid gears have axes in different planes. In reply to questions about quenching, Mr. Candee described the large new press developed by the Gleason works for rigidly holding large gears while hot, during the quenching process.

Earle Buckingham, associate professor, Massachusetts Institute of Technology, Cambridge, Mass., presented the progress report of the special research committee on worm gears.

A serious gap exists in the technical educational system of this country according to W. E. Wickenden, director of investigation, Society for the Promotion of Engineering Education, New York, who presented a forceful paper at the opening of the session on education and training. European countries have gone far ahead of us in the development of the more practical technical schools, said the speaker, who then described in considerable detail the schools of mechanics arts in France, the local technical institutions of Great Britain and the specific industries schools of Germany. Technical education in United States has never been conceived as a national problem and thought out as a whole he said and he urged concerted national thinking on the subject. In the absence of a national board of education Mr. Wickenden feels that initiative in the development of technical schools of nonuniversity type will have to come from organizations such as the American Society of Mechanical Engineers.

He favors recruiting a much larger proportion of our higher technical personnel from men who already have had normal industrial experience. A need exists, he said, for more men trained for the supervision of industrial production. To this end, schools should be organized on less formal scholastic lines, reaching out to the nonbookminded, and shaping their programs on detailed analyses of actual vocational usages.

In discussing Mr. Wickenden's paper, Charles F. Scott, professor of electrical engineering, Yale university, New Haven, Conn., called attention to the need of diplomas in the lower schools. These offer an invaluable incentive to the student as well as a guide to the employer, he said. John T. Faig, president, Ohio Mechanics institute, Cincinnati, said that American industry has leaned heavily on the technically trained men of Europe and he feels that our present facilities fail to develop all types of men needed for the healthy progress of industry.

Virgil M. Palmer, superintendent of industrial economy, Eastman Kodak Co., Rochester, presented a paper entitled, "Industry Specifies Its School Training Needs." As industry becomes more complicated its personnel training requirements change, he said. Industry needs definite and intensive practical training and it is industry's job to specify these needs.

C. S. Coler, Westinghouse Electric & Mfg. Co., East Pittsburgh, discussed this same point and said that he thought if a manufacturer could accurately state his requirements in training new employes, schools such as the Rochester Mechanics institute could provide the men.

Applicants Are Rated

B. O. Snyder, educational director, North East Electric Co., Rochester, outlined the experience of his company in evaluation of applicants by means of tests or questionnaires. From a list of six or eight questions at the start, years of experience had developed a 16-page report which he said he thought gave a comprehensive rating scale. By means of this the company has been able to select and place men with remarkable accuracy. He said he thought industry had the right to profit on its educational investment.

Machine tool guards should be designed by the tool builders, according to C. B. Auel, manager, employe's service, Westinghouse Electric & Manufacturing Co., East Pittsburgh, who gave a talk on safety at the opening of the materials handling session. Short safety discussions preceded many of the technical sessions, and formed a feature of the convention. Mr. Auel said he felt tool users should insist upon safe tool design and construction, and that where it was necessary for the safety of the operator to add guards to the tools, the cost of such guards might well be charged back to the builder.

James Whiting, sales engineer, Lamson Co., Philadelphia, gave an interesting outline of the history of pneumatic tube materials handling. He told of experiments with pneumatic subway systems and then described in detail the present New York city mail delivery system, which at present has 25 miles of pneumatic tubes in operation. Most of the containers or cartridges used are made of steel and peculiarly the expansion of the steel industry has added an important use for pneumatic tubes. This is in connection with the sending of ingot samples from the furnaces to the laboratory for testing and the sending back of the test results. Special protected cartridges to take hot samples have been designed. In one mill, according to the speaker, an installation of 4-inch tubes, 2000 feet long between the melting floor and the testing laboratories is in successful operation. He added that demand for pneumatic equipment is increasing and runs between $4,000,000 and $5,000,000 a year.

Some special types of conveyors were described by W. O. Hildreth, conveyor engineer, Lamson Co. Inc., Syracuse, N. Y., who presented a paper at this same materials handling session. It frequently happens that several types of packages or kinds of material are sent over the same conveyor and that separation of these is desired at the assembly room or shipping department. For such cases a selective package conveyor has been developed. The selective feature is automatic and operates either through difference in weight of packages or by means of a pin placed on certain tote boxes and omitted on others. These pins make electrical contact which actuates a solenoid to shove the box in question off on to a platform or to another conveyor.

Obsolescence Is Factor in Depreciation

(*Concluded from Page* 1397)

"If the original cost of a machine now in operation was $1000 but to replace it would cost $2000, isn't $2000 worth of facility being used?" he asked. Depreciation, therefore, must be figured on reproduction value in addition to the other factors. Depreciation is not so much wear and tear as obsolescence, Mr. Grover stated in the discussion.

Changes, which have taken place since manufacturers determined their earnings by the cash in hand and in their bank accounts, were reviewed briefly by E. F. DuBrul, general manager of the National Machine Tool Builders association, Cincinnati. Today it means something more. Venturing deeper into the problems that confront manufacturers today, Mr. DuBrul drew many questions from his audience. His answer to the question, "What is replacement value?" was, "The price today of what you buy today." Discussing obsolescence, he spoke of the new cutting materials which present new problems in machine tool design.

Editorials

Scrap Sets House in Order

SCRAP, long the Cinderella of the steel industry's raw materials, gradually is obtaining official recognition and is taking a recognized position with iron ore, coke and other essentials. Naturally a primitive process of gathering and merchandising, largely barter, since scrap is not manufactured but simply occurs as a result of other manufacture or obsolescence, little attention was paid to this activity until the United States entered the world war.

Probably the first real recognition of the importance of scrap to the production of steel was Nov. 5, 1917, when President Wilson, on advice of the American Iron and Steel institute, fixed maximum prices on scrap, with iron and steel.

The second recognition was at the 1917 fall meeting of the American Iron and Steel institute, held at Cincinnati in November. At that meeting W. Vernon Phillips, chairman of the institute subcommittee on scrap, delivered an adress on scrap as an important raw material for the steel industry. This was the first time scrap had been considered at an institute meeting.

The third recognition came this week when leading scrap consumers and dealers met with the federal trade commission to discuss means for bringing consumer and dealer into better relation, for the good of all. The meeting is an outgrowth of efforts of the Institute of Scrap Iron and Steel to form a code of trade ethics.

With consumers and suppliers conferring to make conditions better, it would seem the scrap industry is entering the last phase of its progress to a position of full dignity and recognition. It is not denied that sharp practices have marked the industry in the past when top-dressed cars and short weights have been among the abuses charged to dealers. But equally unfair practices are charged to consumers in retaliation. To eliminate both is the effort of the present movement, recognizing that they are costly in the long run.

Hoover a Balance Wheel on Tariff

MUCH heat and some light will be generated at Washington by consideration of the tariff in the next few months. For the Republican party the tariff is not a particularly happy issue and, in view of the country's growing industrial supremacy, is tending to become a minor one. Little of the credit and all of the blame arising from the tariff issue attaches to Republicans.

Unfortunately for the party, the case against the tariff is susceptible of easy conversion into a damaging one, and at this its opponents are dextrous. With farm relief being stressed inordinately, it is mischievous to contrast the so-called frailty of agriculture with the robustness of industry. As southern Democrats repudiate their standard-bearer in the last presidential election and return to their party's historic stand, the opposition closes its ranks.

It has been aptly said that the tariff issue is a local one, and the metals section proves this. On pig iron and finished steel in the great central markets of Pittsburgh, Chicago, Detroit, Cleveland and Youngstown the tariff is not a market factor. Occasionally some alien cast iron pipe does filter in and disturb, but speaking broadly, the tariff is of no consequence there.

On the other hand, imports do distress sellers at exposed coastal points and sellers' desire to raise higher barriers is quite understandable. Increased duties undoubtedly would raise the price moderately to consumers at these points and enable domestic sellers to obtain more remunerative prices, but on the great bulk of steel consumed in this country there would be no effect. The conflict between consumers of manganese ore and domestic producers of ore is apparently irreconcilable.

The matter of practical politics, difficult sometimes to harmonize with pure economics, is no small factor. It may be unfortunate for Mr. Hoover, but it is fortunate for the country that the White House viewpoint on the tariff emanates from a mind versed not only on the domestic situation but also sensitive to the effect of the tariff on world trade. It will be some months before the revision of the act of 1922 is completed, but there is assurance that what congress enacts must pass intelligent scrutiny at the White House.

Shorter Week, or Higher Wages?

EFFORTS now being made by building trades unions to establish a five-day week are meeting with considerable opposition. The movement gained strength in New York recently where some of the building contractors yielded,

notwithstanding the fact the New York Building Trades Employers association declared a five-day week in the metropolitan area will add approximately $40,000,000, or 4 per cent, to the annual cost of building.

An estimate is made by a nationally known building financing corporation that if the five-day week becomes general it will increase the country's annual cost of building construction by nearly $250,000,000. This organization believes construction now is about as efficient as possible; therefore, the five-day week will either delay completion of buildings, or cause them to cost more through heavy over-time labor charges. In Chicago plasterers and painters are on the short week basis, and a similar schedule is being discussed by others for the new wage agreements effective June 1. The majority of the trades in St. Louis already are operating on the five-day week.

The report on union scales of wages and hours of labor by the bureau of labor statistics shows hourly wage rates in the building trades of this country now are over 2.5 times as high as in 1913.

Wages are higher than ever before, while hours of labor are lower than at any time in history. Full-time hours per week for all organized labor average 8.1 per cent lower than in 1913, while their full-time weekly earnings are more than 2.4 times as much in 1913.

Futile as comparisons of this kind may appear in a day which presents so many economic changes compared with 12 years ago, there is much to the argument made by builders that the five-day week is merely another way of demanding higher wages. Wage increases are harder to obtain, but "over-time" to round out a full week's work is another matter.

Welding Code Fills Definite Need

IN PROMULGATING a code for fusion welding and gas cutting of structural steel, the American Welding society has performed an important service to the construction industry. Increase in the use of welding in the fabrication of structures has caused many municipal and other authorities to seek assistance in the formation of regulations to be used in amplifying and revising building codes. Recognizing its obligation to give the needed advice, the Welding society appointed a special committee which promptly codified practices developed to the stage where they could be standardized properly.

The new code, as presented in full on Pages 1404 and 1405 of this issue of IRON TRADE REVIEW, is so arranged that it can be incorporated in whole or in part in existing building codes. It should be pointed out that the specifications have been made conservative.

The specifications are based on practices which have been demonstrated to be safe by experience, covering many full-size destructive tests and numerous welded building structures erected throughout the country. Indicating further the willingness of the Welding society to be of service, the special committee is prepared to assist in the interpretation of the code or its applications.

Codes dealing with fusion welding and gas cutting as applied to piping and tankage in buildings will follow shortly. Other codes will be prepared as need for them arises and probably will include specifications for welding with the electric arc. That demand exists for codes formulated by technical societies is shown by the fact the standard specifications for structural steel prepared by the American Institute of Steel Construction in 1923 now are in effect in more than 175 cities, with more cities considering them.

Curtail Copper to Stabilize Price

CURTAILMENT of copper production is to be resorted to shortly by a number of leading producers of this metal. In view of the recent bullish activities in this industry and the accompanying claim of inability to meet demand as a justification for the rapid advance of prices, such a move indicates that all is not well within the industry. Only a few weeks ago producers were making strenuous efforts to boost output. Today they are planning to cut it. This rapid reversal of policy suggests the possibility that maintenance of production at its present expanded pace is apparently economically dangerous.

Prompt recognition of the threat of over-production in the copper industry presages the elimination of one of the major factors for weakness in this market. There is no denying the fact that since the recent break in prices from 24.00c to 18.00c, demand for the red metal has been almost at a standstill. This lack of buying, undoubtedly, has been fostered to some extent by expectation of consumers that the price would fall still farther as producers' order backlogs began to thin out and the expanded production of the mines and refineries flooded the market with surplus metal.

Stabilization of prices would be impossible with production and consumption out of balance. Neither producers nor consumers stand to benefit from an unsettled market and the prompt action of the copper producers in curtailing production should go a long way toward righting the situation in this market, which has been none too healthy for some months.

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New Simplified Refrigerating Units Made from Welded Steel Sheets. Page 1389.

THE annual spring meeting of the American Society of Mechanical Engineers, in Rochester, N. Y., last week developed great interest in the new cutting alloys, as reported in the article beginning on page 1402. The discussion of tungsten carbide alloys was by far the most spirited feature of the meeting, and the opinions of the engineers concerning future possibilities are reflected in the article. One point brought out was that while castings frequently have been preferred for structural reasons, machining difficulties have imposed obstacles; new cutting tools now being expected to overcome many.

The Readers' Page

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The Business Trend

Building Construction Spurts Ahead

By JOHN W. HILL, Financial Editor

ONE of the important developments of recent weeks has been the change in the course of building construction. After lagging behind 1928 for the first three months of the year, contract awards for new building in April spurted forward. By values, new contract awards amounted to $643,000,000, or only $1,000,000 less than the total for April, 1928. In March the total was $108,000,000 below that of one year before.

APRIL'S figure showed a gain of 32 per cent over March. In practically all parts of the country, from which reports are compiled by the F. W. Dodge Corp., increases were reported compared with the preceding month. The physical volume of construction also expanded. Contract awards in April amounted to 84,900,000 square feet, compared with 77,700,000 square feet in March.

THE improved turn of building is of exceptional significance, as construction activities are of great importance in maintaining general business prosperity.

THE decline this year has been in speculative classes of homes and apartments in and around a few great eastern metropolitan centers. Industrial and many other classes of construction have held at a high level or have gained. The April increase in construction was encouraging because it came at a time when the normal seasonal trend in several other industries is toward some recession.

SLACKENING of the pace of building this year has been laid to high money rates. Whatever effect this may have had, it has not caused any serious decline. Neither has the credit situation, which remains unsettled and uncertain, adversely affected general business. One important indication of the rate of industrial expansion is found in machine tool orders.

INDUSTRY has been buying machine tools on a scale which has no precedent since the reconstruction days following the world war. Nothing short of boom conditions prevail in the industry. This reflects the policy manifest throughout nearly every line looking to lower costs.

The Barometer of Business

INDUSTRIAL INDICATORS

	April, 1929	One month ago	One year ago	Average 1913
Pig iron output (Daily average, tons)	122,000	119,575	105,979	83,900
Blast furnace index 60 per cent—normal	66.4	66	54	62.8
Unfilled orders (tons)	4,427,763	4,410,718	3,872,133	4,518,000
Ingot output (Daily average, tons)	189,924	194,199	172,103	
Dodge Bldg., awards in 37 states (sq. ft.)	84,900,000	77,700,000	94,480,000	
Automobile output	633,000	625,000	414,800	
Coal output, tons	36,871,000	39,210,000	32,200,000	39,869,000
Business failures; number	2,021	1,987	1,918	1,336
Business failures; liabilities	$35,269,000	$36,355,691	$34,985,000	$22,732,000
Cement production, Bbls.	13,639,000	9,969,000	13,468,000	7,704,000
Cotton consumption, bales	631,710	632,808	525,158	438,218
Car loadings (weekly average	995,000	961,000	934,000	

FOREIGN TRADE

	April, 1929	One month ago	One year ago	Average 1913
Exports	$427,000,000	$486,000,000	$368,000,000	$194,000,000
Imports	$409,000,000	$383,000,000	$345,000,000	$149,000,000
Gold exports	$ 1,594,000	$ 1,635,000	$ 96,469,000	$ 5,234,000
Gold imports	$ 24,687,000	$ 26,470,000	$ 5,319,000	$ 5,900,000

FOREIGN EXCHANGE

	Normal	May 20, 1929	One month ago	One year ago
Sterling	$4.86	$4.85 5/8	$4.84	$4.87
Francs	19.3c	3.90 1/2c	3.90c	3.93c
Lira	5.26c	5.23 7/8c	5.22c	5.27c
Marks	23.8c	23.77c	23.70c	23.92c

FINANCIAL INDICATORS

	April, 1929	One month ago	One year ago	1913
25 Industrial stocks*	$373.38	$360.10	†$267.03	$58.19
25 Rail stocks*	$127.02	$127.91	†$126.00	$82.90
40 Bonds*	$87.86	$88.38	†$93.19	$93.00
Bank clearings (000 omitted)	$55,204,000	$63,261,000	$51,756,050	$13,895,000
Commercial paper rate (N. Y., per cent)	6	6	4½-4¾	5.60
Commercial loans (000 omitted)**	$9,015,000,000	$9,073,000	$8,941,842	
Federal Reserve ratio, per cent	72	70	71	
Railroad earnings†	$97,000,000	$84,000,000	$90,774,000	$59,301,000
Stock sales, N. Y. Stock exchange	82,600,000	105,661,000	80,474,835	6,924,000
Bond sales, par value	$212,775,100	$210,517,000	$304,647,400	$41,499,000

*May 20.

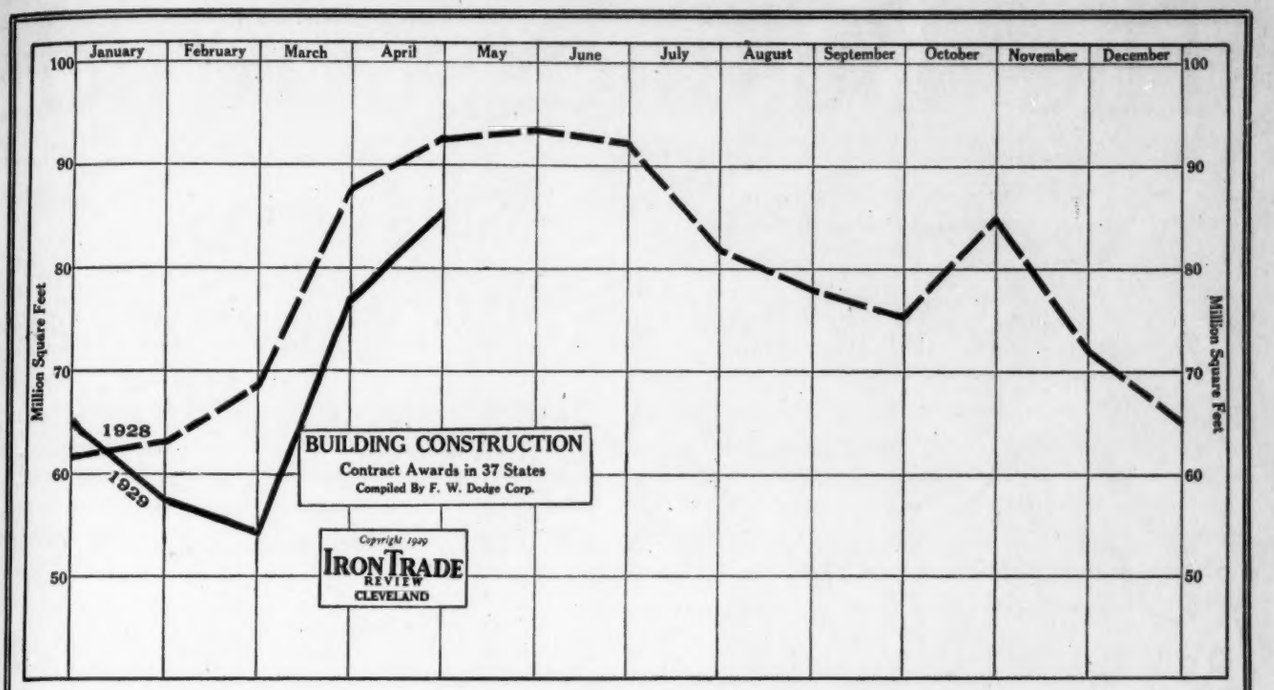
**Leading member banks Federal Reserve System.

†March, 1929.

COMMODITY PRICES

	May 1, 1929	One month ago	One year ago	1913
IRON TRADE REVIEW composite average of 14 iron and steel prices	$36.81	$36.42	$35.57	$26.32
Bradstreet's index	137	138.5	144.8	100
Wheat, cash (bushel)	$1.08	$1.20	$1.53	92c
Corn, cash (bushel)	92c	92c	$1.08	51c
Petroleum, crude (Bbl.)	$4.10	$4.10	$2.80	$2.50

The Business Trend

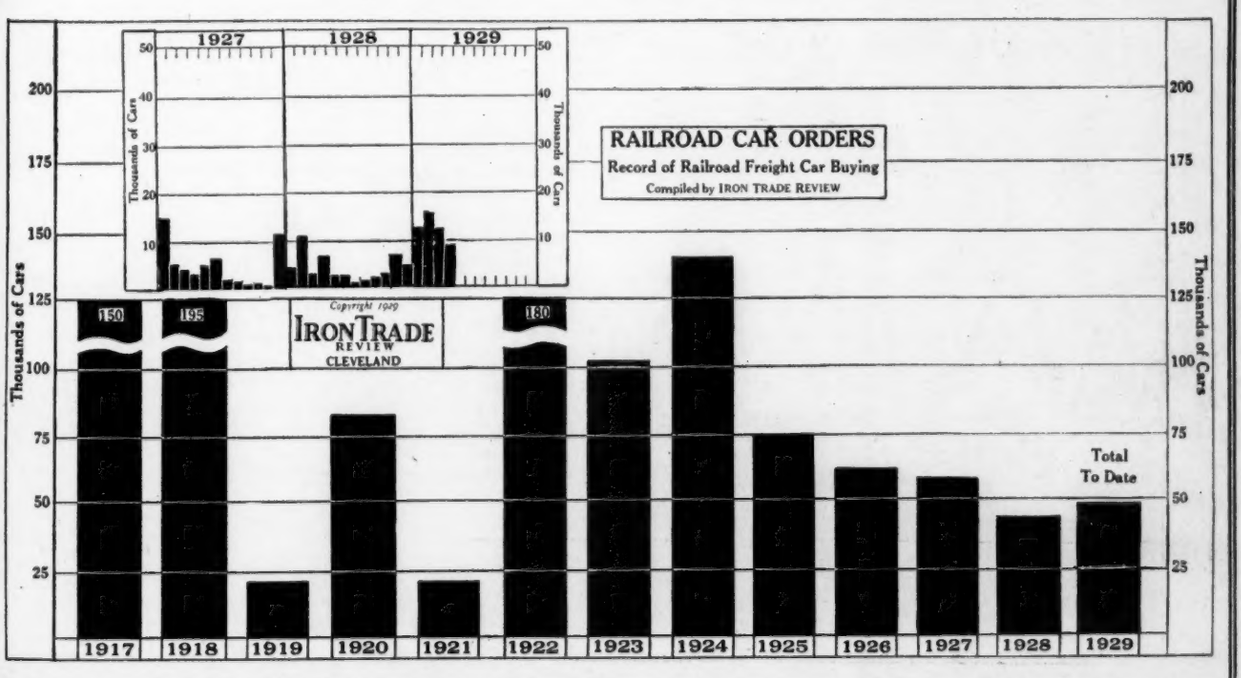


Building Construction

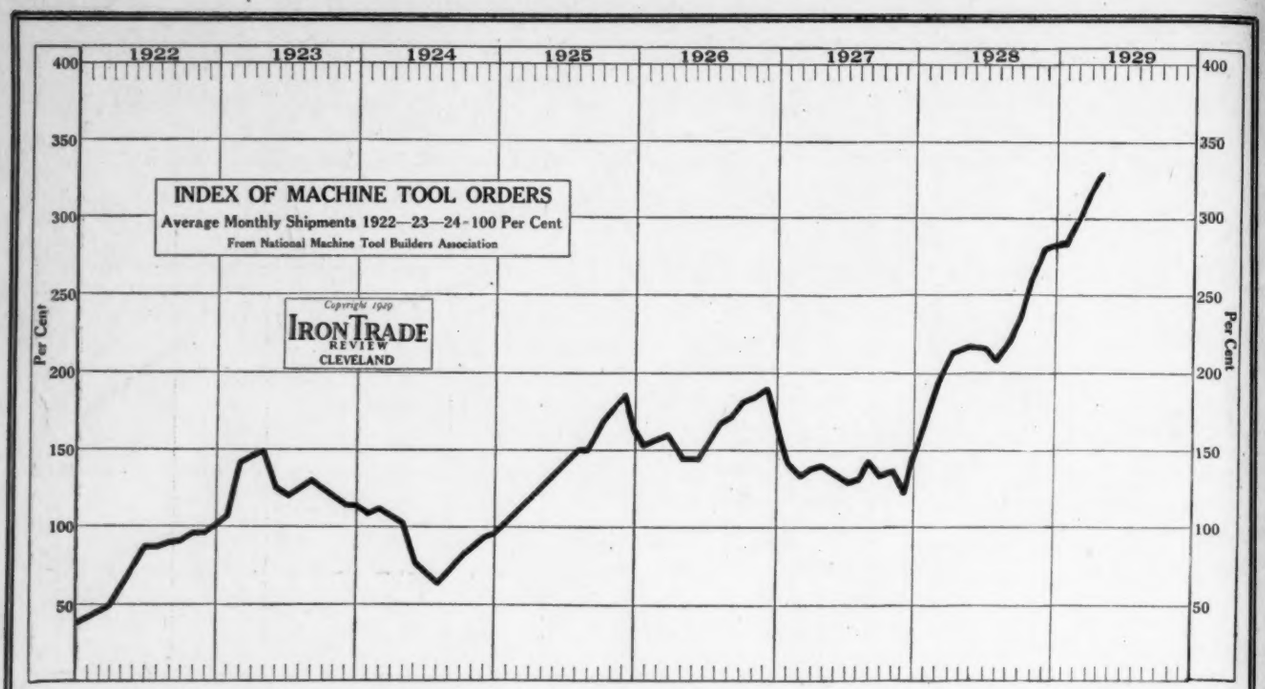
APRIL witnessed a vigorous recovery in the building construction industry. Total contract awards in 37 states as reported by the F. W. Dodge Corp. amounted to 84,981,200 square feet. This compared with 77,710,200 square feet in March and was the highest total since last October. Building continues somewhat below the corresponding date one year ago, the total in April, 1928, being 94,480,500 square feet. The large gain in April building was in residential construction.

Freight Car Awards

DURING the first four months of 1929 railroads have placed orders for 49,328 freight cars. This compares with 23,381 cars ordered during the first four months of 1928 and with 29,300 cars ordered in the corresponding period of 1927. In all of 1928 the roads purchased only 44,763 cars. During April orders for cars were the highest for that month of any recent year. The April total of 8205 cars compared with 12,023 in March and with 6043 in April, 1928.



The Business Trend

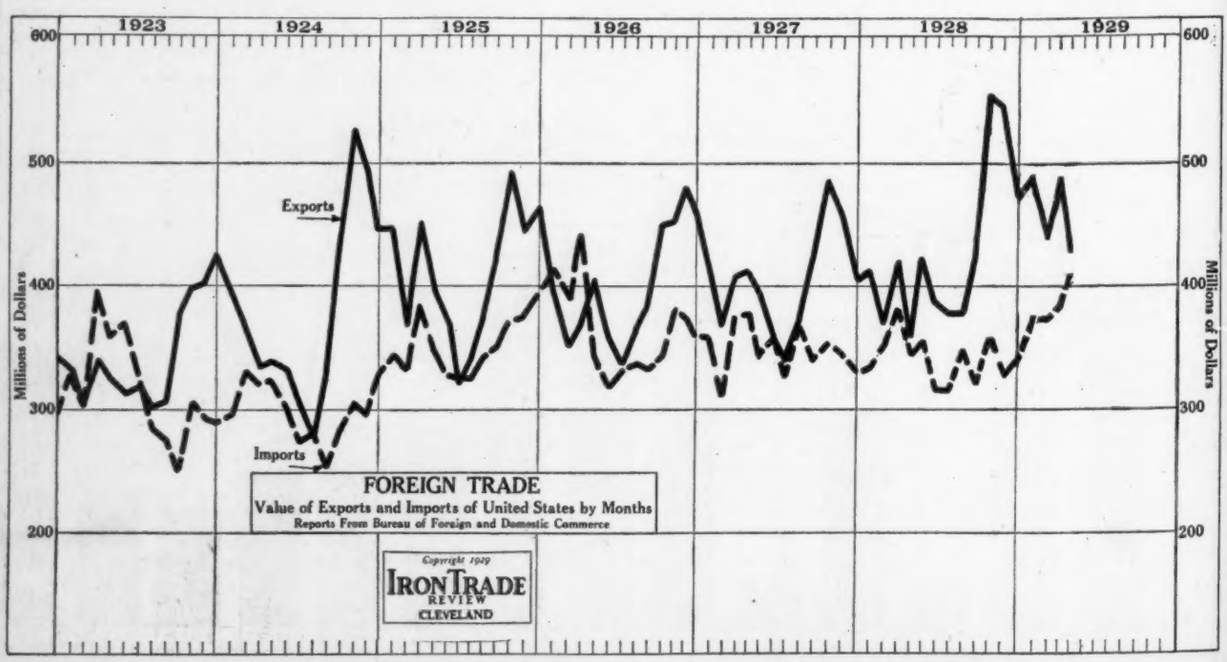


Machine Tool Index

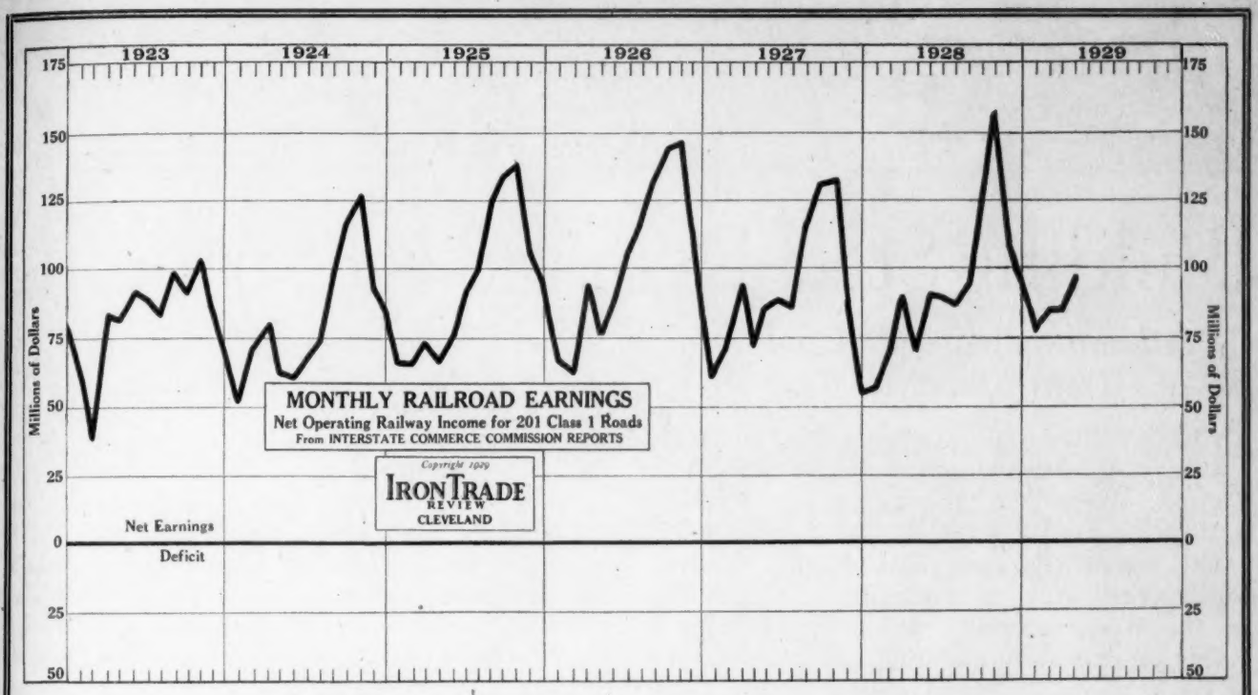
THE index of gross orders for machine tools during April showed a slight decline in volume compared with March, according to the National Machine Tool Builder's association. Apparently February marked a definite peak in the buying movement. Although the monthly figures show declines for the last two months, the three months' moving average depicted in the chart again shows an increase in April. This was because April orders were much greater than those for January.

Foreign Trade

APRIL brought an increase in both exports and imports compared with one year ago. Exports of American merchandise for the month were valued at $427,000,000, compared with $486,000,000 in March and $386,000,000 in April, 1928. Imports of $409,000,000 compared with $383,000,000 in March and $345,000,000 in April one year before. Exports for the first four months of the year were $1,846,658,000, compared with $1,566,771,000 for the period in 1928. Imports of $1,531,155,000 compared with $1,414,720,000.



The Business Trend

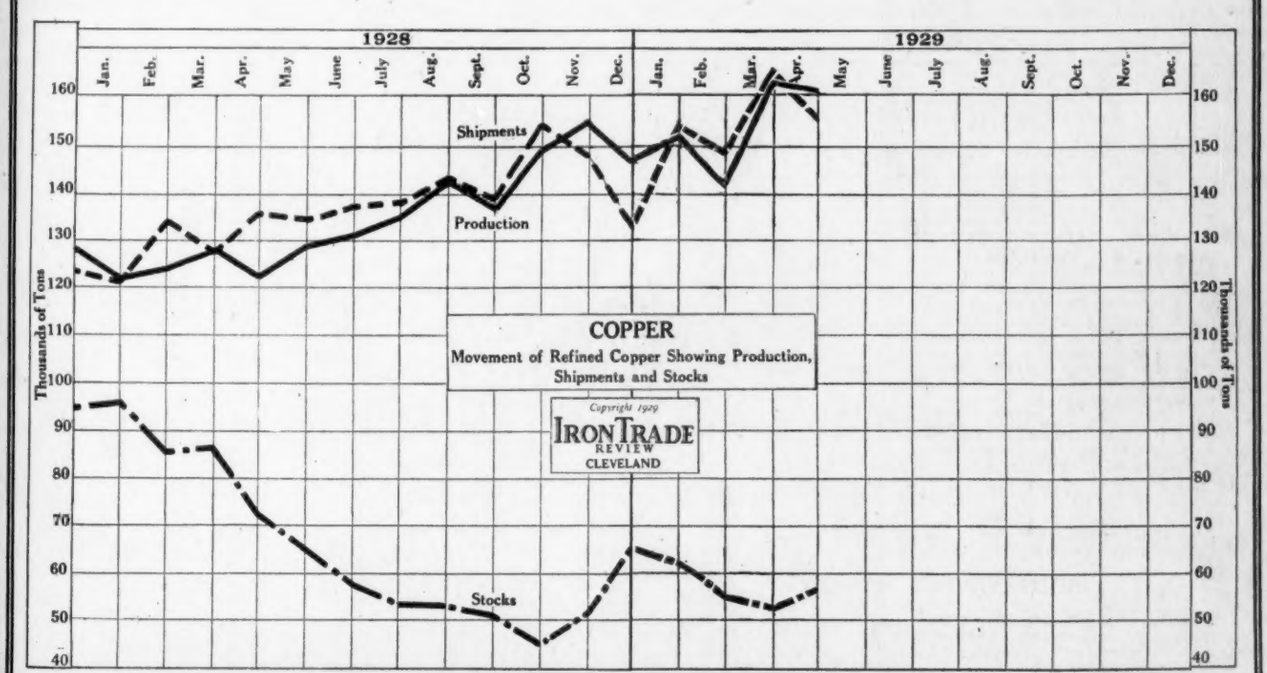


Railroad Earnings

CLASS 1 railroads in the United States during March made an important gain in earnings, reflecting higher operating efficiency as well as expansion of revenue traffic. Net income for the month totaled $97,466,478 compared with $84,000,000 in February and with $90,876,000 in March one year ago. Earnings for the first quarter of the year amounted to $259,541,881, compared with $217,370,419 in the corresponding quarter of 1928. Traffic this year has run about 4 per cent ahead of one year ago.

Refined Copper

APRIL brought the first increase in stocks of copper reported this year. Refined copper in the hands of North and South American producers at the close of the month amounted to 57,494 tons, compared with 52,968 tons in March and with 72,893 tons in April, 1928. Production was 161,285 tons compared with 163,561 tons in March. The daily average rate, however, increased slightly. Shipments of 156,759 tons declined from the total of 165,806 tons in March and 148,921 tons in February.



Building Steel Demand Is Expanding

Substantial Awards Lend Vigor to Market—Delivery Situation Still Tight—B. & O. Buys 3070 Cars—Steel Lake Trade Grows

STRUCTURAL steel requirements are beginning to command seasonal attention. While not spectacular, the aggregate of recent lettings has been substantial, and it appears that credit restrictions have not seriously hindered construction work involving steel in quantity. In the West, especially, railroad and highway bridge programs are maturing, and for the county as a whole structural mills now are better booked than one month ago and one year ago. Reinforcing steel sales also are expanding.

Heavy Steel Specifying Broadens

Other major outlets for finished steel still display an appetite which even mill operations averaging over 95 per cent find difficult to appease. Considering all products, shipments top specifications by a narrow margin, but deliveries are not perceptibly easier. In fact, bar and plate deliveries have tightened at Pittsburgh and a flareback in buying at Chicago has restored a 14-week promise on some products.

Automotive production thus far in May has equaled the rate of April, when 620,656 cars and trucks, or 6 per cent more than in record March, were assembled. Forecasts of a summer letdown in this industry now name July. Freight car builders have been reinforced by the Baltimore & Ohio distribution of 3070 cars, requiring upward of 70,000 tons of steel. The initial order of steel pipe for the Louisiana-Atlanta line is for 100,000 tons, with more to come, while 20,000 tons was bought for a pipeline in Arkansas.

Sheet Prices Are Reaffirmed

Sheet producers are reaffirming for the third quarter their official prices for the current quarter, namely, 3.70c, Pittsburgh, on galvanized, 2.95c on black and 4.10c on autobody. Provided the full prices on black and galvanized sheets are obtained, this will represent an advance of several dollars over sales to some users. Practically all makers have gone to the new method of quoting blue annealed and are asking 2.20c, Pittsburgh, for No. 10 blue annealed plates and 2.35c for No. 13 blue annealed sheets. Sheet specifications are substantially as brisk as 30 days ago. April sheet shipments by independent

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	May 22, 1929	April 1929	Feb. 1929	May 1928
PIG IRON				
Bessemer, del. Pittsburgh	$20.76	20.26	19.86	19.26
Basic, valley	18.50	18.00	17.50	16.20
Basic, eastern, del. eastern Pa.	20.65	20.25	20.50	19.10
No. 2 foundry, del. Pittsburgh	20.26	19.86	19.26	18.86
No. 2 foundry, Chicago	20.00	20.00	20.00	18.20
*Southern No. 2, Birmingham	15.50	15.50	16.50	16.00
**No. 2X, Virginia furnace	20.75	20.75	21.25	20.50
**No. 2X, eastern del. Phila.	22.76	22.26	22.01	21.26
Malleable, valley	19.00	18.50	18.00	17.25
Malleable, Chicago	20.00	20.00	20.00	18.20
Lake Superior charcoal, del. Chicago	27.04	27.04	27.04	27.04
Gray forge, val., del. Pittsburgh	19.26	19.26	18.76	18.76
Ferromanganese, del. Pittsburgh	109.79	109.79	109.79	109.79
*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.				
COKE				
Connellsville furnace, ovens	2.75	2.75	2.90	2.55
Connellsville, foundry, ovens	3.75	3.75	3.75	3.55
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	36.00	35.00	34.25	33.10
Sheet bars, open-hearth, Pittsburgh	36.00	35.25	34.25	33.50
Billets, open-hearth, Pittsburgh	36.00	34.50	33.25	32.50
Wire rods, Pittsburgh	42.00	42.00	42.00	44.00

	May 22, 1929	April 1929	Feb. 1929	May 1928
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.95	1.95	1.90	1.85
Steel bars, Chicago	2.05	2.05	2.00	2.00
Steel bars, Philadelphia	2.27	2.27	2.27	2.17
Iron bars, Chicago	2.05	2.05	2.05	2.00
Shapes, Pittsburgh	1.95	1.95	1.90	1.85
Shapes, Philadelphia	2.00	2.06	2.01	2.08
Shapes, Chicago	2.05	2.05	2.00	2.00
Tank plates, Pittsburgh	1.95	1.95	1.90	1.85
Tank plates, Philadelphia	2.15	2.15	2.10	2.05
Tank plates, Chicago	2.05	2.05	2.00	2.00
Sheets, black, No. 24, Pittsburgh	2.95	2.90	2.85	2.75
Sheets, blue anl., No. 10, Pittsburgh	2.20	2.15	2.10	2.00
Sheets, gal., No. 24, Pittsburgh	3.70	3.65	3.60	3.65
Sheets, black, No. 24, Chicago	3.10	3.10	3.00	2.85
Sheets, blue anl., No. 10, Chicago	2.35	2.35	2.25	2.20
Sheets, galvanized, No. 24, Chicago	3.85	3.85	3.75	3.80
*Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
*Wire nails, Pittsburgh	2.65	2.65	2.65	2.60
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.25
*To large jobbers.				
SCRAP				
Heavy melting steel, Pittsburgh	17.75	18.50	18.60	15.00
Heavy melting steel, eastern Pa.	16.25	17.00	16.30	13.75
Heavy melting steel, Chicago	15.25	17.00	16.25	12.95
No. 1 wrought, eastern Pa.	16.25	16.25	16.25	15.25
No. 1 wrought, Chicago	16.25	16.65	15.75	13.05
Rails for rolling, Chicago	17.50	17.50	17.50	14.35

Current Prices for Rolled Steel Products

PRICES IN CENTS PER POUND

STEEL PLATES

Pittsburgh, base	1.95c
Philadelphia, del.	2.15c to 2.25c
New York, del.	2.225c to 2.325c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Coatesville, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
St. Louis, del.	2.27c
Detroit, del.	2.19c to 2.24c

STRUCTURAL SHAPES

Pittsburgh, base	1.95c
Philadelphia, base	2.00c to 2.11c
New York, del.	2.195c to 2.245c
Boston, del.	2.265c to 2.415c
Chicago, base	2.05c to 2.15c
Cleveland, delivered	2.14c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c to 2.24c

BARS

SOFT STEEL

Pittsburgh, base	1.95c
Chicago, base	2.05c to 2.15c
Birmingham, base	2.10c to 2.20c
Lackawanna, N. Y., base	2.05c to 2.15c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.95c
Cleveland, del., outside mills	1.95c to 2.00c
Philadelphia, del.	2.27c to 2.37c
New York, delivered	2.29c to 2.39c
Boston, delivered	2.265c to 2.415c
Detroit, del.	2.19c to 2.24c
Pittsburgh, cold finishing	2.05c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.05c to 2.15c
New York, delivered	2.14c to 2.24c
Philadelphia, delivered	2.12c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.30c
Stock lengths from mill	2.00c
Chicago, billet	2.40c to 2.90c
Chicago, rail steel	2.00c to 2.05c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.57c to 2.62c

SHEETS

SHEET MILL BLACK, NO. 24

Pittsburgh, base	2.85c to 2.95c
Philadelphia, delivered	3.17c to 3.27c
Gary, Indiana Harbor	3.05c
Chicago, delivered	3.10c
Birmingham, base	3.10c
St. Louis, del.	3.27c
Pacif. coast ports, c.i.f.	3.50c

TIN MILL BLACK, NO. 28

Pittsburgh, base	3.00c
Gary, base	3.10c

GALVANIZED, NO. 24

Pittsburgh, base	3.60c to 3.70c
Philadelphia, delivered	3.92c to 4.02c
Gary, Indiana Harbor	3.80c
Chicago, delivered	3.85c
Birmingham, base	3.85c
St. Louis, del.	4.02c
Pacif. coast ports, c.i.f.	4.25c

BLUE ANNEALED

Sheets, No. 13

Pittsburgh, base	2.30c
Chicago district mills	2.45c
Chicago, delivered	2.50c

Plates, No. 9 and 10

Pittsburgh, base	2.20c
Chicago district mills	2.30c
Chicago, delivered	2.35c

AUTOMOBILE, NO. 20

Pittsburgh, base	4.10c
Detroit, delivered	4.39c

FURNITURE

Pittsburgh	4.20c

(Turn to the following page)

producers, at 377,324 tons, set a new high record. Sales, however, declined slightly from March.

On bars, plates and shapes third quarter books are expected to be opened in a fortnight. At both Pittsburgh and Chicago plates are making a good showing. Pittsburgh and eastern mills will benefit almost exclusively from the heavy buying for the Baltimore & Ohio cars. New business in all heavy steel lines spurted at Chicago the past week and practically canceled recent gains on backlogs. Specifications for bars and plates at Pittsburgh exceed the rate of April. On heavy steel 1.95c, Pittsburgh, is firm.

Semifinished steel continues in a sellers' market, though a test of recent price advances is coming shortly with third quarter contracting. Iron and steel scrap prices generally are sagging under the weight of heavy supplies. Coke prices are steady and unchanged. With the Frick interest firing additional ovens, output by furnace interests reaches the highest level of the year.

To Blow In Neville Stack

Chicago leads in pig iron interest, it being estimated that half of the district's production for third quarter already has been sold. Spot selling there also is good. In other districts third quarter business has not been undertaken seriously. Production of merchant iron may be curtailed at Birmingham, as the surplus of producers increases. Continued heavy steelmaking operations lend strength to the merchant iron market in the valley district. The merchant stack on Neville island, Pittsburgh, goes into blast the last week of May, with books opened on a basis of 50 cents above the valley market for shipments in the greater Pittsburgh district, including Allegheny county, and on a regular valley basis for other tonnage.

Corporation Subsidiaries at Capacity

Steel corporation subsidiaries are operating this week at capacity, and with independents just under 95 per cent the industry's average approximates 97 per cent. Chicago mills hold to a 98 per cent rate despite some repair work, while the Pittsburgh district averages 95 per cent. Forty-nine out of 51 independent open hearth furnaces are active in the Mahoning valley, and 32 out of 37 at Buffalo. Out of 125 independent sheet mills in the Mahoning valley 114 are operating this week. All merchant stacks and 29 of 36 steelworks stacks are on at Chicago.

The United States Steel Corp. has joined the issue with independent producers on Great Lakes shipments of steel. The Illinois Steel Co., a subsidiary, will shortly begin moving sheet bars and structural steel by water from the Chicago district to Detroit. Other units of the corporation may also turn to water delivery, which independent producers at Lake Erie ports have developed.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (May 22, 1929)	$37.13
Last week (May 15, 1929)	37.13
One month ago (April, 1929)	36.81
Three months ago (February, 1929)	36.28
One year ago (May, 1928)	35.54
Ten years ago (May, 1919)	48.29
Fifteen years ago (May, 1914)	22.99

IRON TRADE REVIEW composite of fourteen leading iron and steel products stands unchanged this week at $37.13, its highest point in over 28 months. Many believe prices are at the top of the spring rise.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

Tubular Products Quoted On Last Editorial Page—See Preceding Page For Other Products

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	2.00c
Hot strip 6 1/8 to 24-in., Pitts.	1.90c
Hot rolled strip, 12 to 24-inch 16 gage and heavier, coils or cut length, 1.90c plate basis, or 2.10c blue annealed basis.	
Hot strip, bands 6 in. and under, Chicago	2.10c to 2.30c
Do, 6 1/8 to 24 in.	2.00c to 2.10c
Cooperage stock, Pittsburgh	2.20c
Do, Chicago	2.30c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve. (3 ton and over)	2.75c to 2.85c
Worcester, Mass. (3 tons and over)	3.10c to 3.20c

ALLOY STEEL

Hot Rolled

F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net 100 lb. bars
2000	0.25	$2.90
2100	0.55	3.20
2300	1.50	4.15
2500	2.25	4.90
3100	0.55	3.20
3200	1.35	4.00
3300	3.80	6.45
3400	3.20	5.85
4100 0.15-0.25 Mo.	0.50	3.15
4100 0.25-0.40 Mo.	0.70	3.35
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.70
5100 0.60-0.90 Cr.	0.35	3.00
5100 0.80-1.10 Cr.	0.45	3.10
5100 Chrome Spring	0.20	2.85
6100 Bars	1.20	3.85
6100 Spring Steel	0.95	3.60
Chrome Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60
9250 (flats)	0.25	2.90
9250 (rounds squares)	0.50	3.15

COLD FINISHED STEEL

Cold finished steel bars drawn or rolled, Pitts., Chi., c.l.	2.30c
Do, del. Detroit	2.575c
Shafting (turned, polished) Pittsburgh	2.30c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.65c to 3.10c
Cold finished steel bars, Cleve.	2.25c to 2.35c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland, Ironton base

(Per Pound)	Dealer trade	Large jobbers
Bright plain wire, 6 to 9 gage	2.60c	2.50c
Annealed field wire	2.75c	2.65c
Galvanized wire	3.20c	3.10c
Barbed wire, galvanized	3.40c	3.30c
(Per 100-pound keg)		
Wire nails	$2.75	$2.65
Galvanized nails	4.75	4.65
Polished staples	3.20	3.10
Galvanized staples	3.45	3.35
Cement coated nails	2.75	2.65
Manuf. wire, del. Detroit		2.735c
Wire nails, del. Detroit		$2.885

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Worcester, Mass., Fairfield, Ala., $3 higher.

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Anderson, Ind., $1 higher, Chicago $2 higher, Duluth, Birmingham $3 higher.

CUT NAILS, CHAIN PILING

Cut nails, c.l., f.o.b. mills	2.70c to 2.75c
Cut nails, l.c.l. f.o.b. mills	2.80c to 2.85c
Chain, 1-in., proof coil, Pitts.	6.00c
Sheet piling, base, Pittsburgh	2.25c

CAST IRON WATER PIPE

Prices per net ton

Class B pipe

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	49.20 to 50.20
Six-inch to 24-inch, Chicago	45.20 to 46.20
Six-inch and over, New York	38.00 to 40.00
Four-inch, New York	41.00 to 42.00
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN AND TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24 .. 4.00c to 4.10c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist	$6.50 to 6.75 off
Wrought, c.l., Chicago dist	$6.70 to 6.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 29.00
Light rails, 25 to 45, mill	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand, jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off
Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.	
Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off
Rolled thread 3/8 x 6 and smaller take 10 per cent lower list.	
Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off
Stove bolts, 75, 20, 10 and 5 off in pkgs., 75, 20, 10 and 5 with 2 1/2 off in bulk.	
Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	85-off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts-Cleve.	3.10c
Structural, c.l. Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED MATERIAL

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$36.00
Pittsburgh, bessemer	36.00
Youngstown	36.00
Cleveland	34.00
Philadelphia	39.30 to 41.30
Chicago	37.00
Forging, Chicago	40.00
Forging, Pittsburgh	41.00
Forging, Philadelphia	44.30 to 46.30

SHEET BARS

Pittsburgh	$36.00
Youngstown	36.00
Cleveland	35.00
Chicago	37.00

SLABS

Pitts., Young.	$36.00
Cleveland	34.00

WIRE RODS

Pittsburgh, Cleveland	$42.00
Chicago	43.00

SKELP

All grades, Pittsburgh	1.90c to 1.95c

IRON ORE

LAKE SUPERIOR ORE

Per Gross Ton, Lower Lake Ports

Old range bessemer, 51 1/2 %	$4.80
Mesabi bessemer, 51 1/2 %	4.65
Old range nonbessemer, 51 1/2 %	4.65
Mesabi nonbessemer, 51 1/2 %	4.50
High phosporus, 51 1/2 %	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63 %	8.00
Copper free low phosphorus 58 to 65 per cent	nominal

FOREIGN ORE

Cents per unit, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55 % iron, 6-8 % manganese	11.00 to 11.50
North African low phosphorus	12.00 to 12.50
Swedish foundry or basic, 65 %, nominal at	9.00 to 10.00
Spanish and North African basic, 50 to 60 per cent	11.50 to 12.00
Newfoundland foundry, 55 %	nominal
Tungsten spot and early fut., short ton unit, duty paid	16.00 tho 17.00

MANGANESE ORE

Prices do not include duty of 1 cent per pound of metallic manganese contained.

Brazilian	34 to 36 cents
Indian	34 to 36 cents
Caucasian, (53-55 per cent)	36 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, import duty paid east. tide., gross ton	$20.15

REFRACTORIES

FIRE CLAY BRICK

Per 1000 f.o.b. works

First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4 1/2 x 2 1/2	65.00

MAGNESITE

Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00

CHROME BRICK

Net ton Chester, Pa., and Baltimore base

9 x 4 1/2 x 2 1/2	45.00

Pig Iron

Market Is Quieter, and Prices Easier in Some Districts—Third Quarter Business Light—Half of Chicago Tonnage Closed

NEW orders for pig iron are smaller than in recent weeks. Chicago furnace interests, however, report no diminishing of demand, and that 50 per cent of the available merchant iron production in the Chicago district for third quarter has been covered. Western Ohio, Michigan and Indiana also continue to present an active market for lake furnaces. Elsewhere the markets are quiet, and prices a shade easier. Large users are not disposed to cover for third quarter, anticipating sharper competition by furnace interests. Shipments, however, continue brisk, and makers are not pushing third quarter sales. A Pittsburgh interest with a local furnace scheduled to go in blast this month has adopted a new price schedule for delivery in the local area.

PITTSBURGH, May 21.—A pig iron seller with a local furnace scheduled to go in blast the last week of this month has opened books with a new price schedule for delivery in the greater Pittsburgh district, which includes Allegheny county. The new prices are 50 cents above the valley levels, but apply only on iron shipped in this district. On orders for outside shipment the valley base prevails. New pig iron business generally is moderately active, although some buyers are deferring third quarter purchases, anticipating lower prices. The market is strengthened by continuation of heavy operations at steelworks which prevent more active participation of steelworks blast furnaces in the open market. Shipments are well maintained, with the exception of a slower rate to some users of foundry iron. Current prices are steady.

Boston, May 21.—Pig iron buying is at a minimum, because of the belief prices will be easier. The Whitings Machine Co., Whitingsville, Mass., has not closed on its recent inquiry for 2000 tons of No. 1X. It is reported less than the equivalent of $19, Buffalo, has been quoted on this tonnage.

New York, May 21.—Pig iron sales in the past week aggregated 12,000 tons or more. Several large consumers may close soon. The melt has decreased in some directions but on the whole is well maintained. Shading of prices is resorted to occasionally. The foundry iron market usually is on the basis of $19, base, Buffalo, equivalent to $22.28 to $23.91, delivered in this territorv, but on some sales the delivered prices have been 50 cents to $1 lower.

Buffalo, May 21.—Pig iron producers look for a rapid broadening of inquiry and a general buying movement early in June. Shipments continue heavy. Minimum prices are $19.50, base, furnace, for local shipment, and $18.50 in the East. Tonawanda Iron Co. has shipped 3000 tons to northern plants of the American Radiator Co. by boat, while merchants here will load several thousand tons this week for movement by barge canal.

Philadelphia, May 21.—Pig iron shipments continue brisk, but new sales are light. Eastern Pennsylvania foundry iron is firm at $21.50, base, furnace, but sales of outside iron occasionally are made at delivered prices which would figure slightly lower. A small sale of basic at $20.50, eastern Pennsylvania furnace, is noted. Some inquiries for low phosphorus iron are pending. Prices of foreign iron are higher, English low phosphorus now being held at $24, duty paid, tidewater. Indian foundry iron is $21.75 to $22, duty paid, base, tidewater. Dutch iron is $22.25 to $23, duty paid, tidewater.

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$19.00
Bessemer, del. Pittsburgh	20.76
Basic, valley furnace	18.50
Basic, del. Pittsburgh	20.26
Basic, Buffalo furnace	18.50
Basic, del. eastern Pa.	20.65 to 21.00
Malleable, valley furnace	19.00
Malleable, del. Pittsburgh	20.76
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	22.76 to 24.40
Malleable, Granite City fur.	20.50
No. 1 foundry, Chicago furnace	20.50
No. 1X, Eastern del., Phila.	23.26
No. 1X, Buffalo furnace	21.00
No. 2 foundry, valley furnace	18.50
No. 2 foundry, del. Pittsburgh	20.26
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy. Cleve. fur. for local del.	19.00
No. 2 plain, del., Phila.	22.26
No. 2 plain, Virginia furnace	20.75
No. 2 plain, Buffalo, del. Boston	23.41 to 23.91
No. 2 plain, N. J., tidewater	22.28 to 22.78
No. 2 Alabama, Bir. base	15.00 to 15.50
No. 2 Tenn., Birmingham base	15.50
No. 2 Tenn., del. Cincinnati	19.19
No. 2 Alabama, del. Cincinnati	18.69 to 19.19
No. 2 Alabama, del. Chicago	21.51
No. 2 Alabama, del., Cleveland	21.76
No. 2 Alabama, del. St. Louis	19.92
No. 2X, east N. J., tidewater	22.78 to 23.28
No. 2X, eastern, del. Phila.	22.76
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	23.91 to 24.41
No. 2X, Virginia furnace	20.25 to 20.75
Gray forge, val., del. Pittsburgh	19.76
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.26 to 24.76
Low phos., copper bearing fur.	23.00 to 23.50
Charcoal, Superior, del., Chicago	27.04

CANADIAN PRICES

No. 2 foundry, del. Toronto	24.10 to 24.60
No. 2 foundry, del. Montreal	25.50 to 26.00
Malleable, del. Toronto	24.10 to 24.60
Malleable, del. Montreal	25.50 to 26.00
Basic, del. Montreal	24.50 to 25.00

Silvery iron, Jackson county, O., furnaces, in per cents: 5—$23 to $24; 7—$25 to $26; 8—$26 to $27; 9—$27 to $28; 10—$29 to $30; 11—$31 to $32; 12—$33 to $34; 13—$35 to $36.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$31 to $32; 11—$33 to $34; 12—$35 to $36; 13—$37 to $38; 15—$41.50 to $42.50; 16—$43 to $44.

Youngstown, May 21.—The valley pig iron market is quiet, with prices firm. Most consumers are covered for second quarter and few inquiries have appeared for the third.

Cleveland, May 21.—New inquiries for pig iron have been tapering off gradually, in size and number, and current business consists mainly of small and moderate size lots for filling purpose. Some sellers say buyers showed more interest in third quarter requirements several weeks ago than they display today. This evidently is not due to any decrease in the melt as shipments continue at the April rate, and for some producers May shipments will exceed those of last month. Large melters, however, do not appear to be anxious to cover for third quarter. Sales by furnace interests represented in Cleveland totaled 15,000 tons in the past week, the rate at which foundry and malleable sales have been running for several weeks. Cleveland furnaces continue to offer iron for outside shipments at $18.50, base, furnace, and $19, base, for local consumption. Other lake furnace prices are unchanged. No further sales of basic are noted since a Cleveland furnace claimed to have sold 10,000 tons recently at $18.50, valley, included in the 30,000 tons of basic sales reported in last week's issue of IRON TRADE REVIEW.

Detroit, May 21.—More inquiries are current for third quarter pig iron. A few customers have prevailed upon makers to accept their contracts for that period. May shipments will be on a par with or a little ahead of April's. While $21 sometimes has been obtained on single carloads of malleable, $20.50 for that grade as well as No. 2 foundry is the more representative figure.

Cincinnati, May 21.—Consumers are reluctant to cover for third quarter pig iron. Business closed is generally for delivery in June and early July. One northern seller received orders for 5900 tons. Buyers seem to feel that weakness in the southern market may extend to the North. A Michigan melter is inquiring for 300 to 500 tons of northern iron. The southern iron market is quiet.

Chicago, May 21.—Interest in future iron continues to show vigor in the northern pig iron market in this district. Spot buying is above normal.

(*Concluded on Page* 1420)

The Market Section

Coke

Furnace Interests Increase Coke Production to Highest Point of Year—Specifications Holding

BEEHIVE coke production by furnace interests has been increased to the highest point of the year, with the lighting of additional ovens by one of the leading makers. Output by merchant ovens exceeds the combined total of a year ago. Demand for furnace coke on contracts continues heavy, but spot orders are small. Prices are steady.

Pittsburgh, May 21.—The market for beehive coke continues dull. There is a dearth of spot orders, but as producers are offering little for prompt shipment the tone is steady, and furnace coke holds to its previous level of $2.75 to $2.85. No letup is noted in shipments on contracts, and production at merchant ovens is holding up well. H. C. Frick Coke Co. has lighted additional ovens, bringing the total to 2360, and boosting output by furnace interests to the highest point this year. Production of merchant ovens alone, however, is larger than the combined total a year ago. Foundry coke shipments continue at a slower rate than noted a short time ago, but this trend is not general.

Production of coke in the Connellsville region for the week ended May 11 was 95,793 tons, compared with 94,250 tons the preceding week, according to the *Connellsville Courier*.

Boston, May 21.—Foundry coke orders continue small. Prices are firm. The New England Coal & Coke Co. is reported to be planning a new battery of ovens. This company, the New Haven oven and the Providence Gas Co., have opened books for the last half of the year, portecting their customers at anything above $11 for coke delivered within the $3.10 freight rate zone.

New York, May 21.—Foundry coke specifications are holding up. Spot demand is dull. By-product foundry coke continues $11, delivered at most New England consuming points; $9 to $9.40, delivered at Newark, N. J., and $9, delivered to Philadelphia consummers. Beehive foundry coke continues $3.75 to $4, Connellsville, and $4.85, Latrobe, Pa.

Detroit, May 21.—By-product foundry coke consumption is holding approximately to the April rate. Some foundries are increasing specifications. Automobile casting foundries operate their cupolas at a high rate and fuel sellers are able to see no letdown. The market is unchanged at $9, ovens.

Cincinnati, May 21.—Movement of foundry coke on current contract is good, but new business is scarce. Beehive coke is in fair demand. Prices are steady.

St. Louis, May 21.—Some slowing in demand for metallurgical coke is noted in this district, but shipments during the first half of May were ahead of the corresponding period a year ago. By-product plants have increased slightly their surplus of foundry coke. Prices are steady.

Birmingham, Ala., May 21.—The coke market holds fairly firm, with shipments to foundries in the Middle West. Production is not much under capacity, and independent producers are not piling much stock.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.75 to 2.85
Connellsville foundry	3.75 to 4.85
New River foundry	6.00 to 6.50
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.75
By-Product Foundry	
Newark, N. J., del.	9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell, basis	6.50
Portsmouth, O., ovens, Connell, basis	6.50
Buffalo, ovens	8.75
Detroit, ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Shipments Heavy—Spot Orders Numerous, But Small

Pittsburgh, May 21.—Shipments of ferromanganese, spiegeleisen and special ferroalloys continue heavy. Although most tonnage consists of contract business, sellers are receiving a steady flow of small spot orders. Current prices of $109.79, delivered, Pittsburgh, for ferromanganese, and $34 for spiegeleisen are firmly held on spot transactions. Fluorspar is fairly active, with $18 firm on new business.

New York, May 21.—Special ferroalloys are active. Tungsten ore prices range between $16 and $17, a short ton unit, duty paid, over the next few months. It looks as if far distant future shipment from China will be a little easier, but users appear uninterested in buying ore that would arrive in the autumn or early winter. Tariff on ferrotungsten probably will remain unchanged, though on ore it probably will be raised 5 cents a pound contained.

Chicago, May 21.—Specifications for ferroalloys are at an unusually high rate. For ferromanganese and 50 per cent ferrosilicon they are estimated to be 10 to 15 per cent above monthly requirements of last year. Prices are unchanged. A few spot sales of spiegeleisen are reported on the basis of $34, eastern furnace, for 19 to 21 per cent metal in carload lots. A cargo of English spiegeleisen, 28 per cent, has arrived here, after transshipment from Montreal.

Bolts, Nuts, Rivets

Specifications Hold to Heavy Volume, With Rivets More Active

NUT AND BOLT PRICES, PAGE 1416

Pittsburgh, May 21.—Little change is noted in the active rate of specifications. Business is running ahead of last year, particularly in rivets, with railroad equipment builders accounting for the largest gain over the 1928 tonnage. Demand is well diversified, however. Operations hold around 70 per cent.

Cleveland, May 21.—Various consuming lines taking nuts, bolts and rivets are active, fairly large tonnages still going to the automobile industry. Jobbers lately have been rounding out their stocks. Operations average 75 to 80 per cent. Prices are firm.

Chicago, May 21.—Consumers of bolts and nuts are specifying steadily. Third quarter books probably will be opened in two weeks. Expectations are that prices will be unchanged. Bolts and nuts are steady at 60 to 70 off list, and large structural rivets in carload orders are 3.20c, Chicago.

The National Slag association will hold its twelfth annual meeting at the Tutwiler hotel, Birmingham, Ala., May 27-29. H. J. Love, 937 Leader building, Cleveland, is secretary of the organization.

Ferroalloy Prices

(In dollars, except ferrochrome)

Ferromanganese, 78 to 82 per cent, tidewater, duty paid	$105.00
Ferromanganese, del. Pittsburgh	109.79
Spiegeleisen, 19 to 21 per cent, domestic furnace, spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do, less carload	88.50
Do., 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.40 to 1.50
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload, producer's plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Quantity diff. apply on 100 tons and over.
*These prices contract, spot $5 higher.

Scrap

Steady But Slow Decline in Prices Continues—Large Supplies Cause Heaviness

FREE marketing of accumulations of scrap is more than prices can withstand, even though the unusually heavy melt continues unabated. Prices are sagging slowly and new levels are establishing each week. Rejections are fewer and distress scrap is being absorbed, at a sacrifice in price.

Chicago, May 21.—In the face of continued large consumption of steel scrap in this district, weakness is spreading from the steelmaking grades through the list. Prices on numerous grades have dropped 25 to 50 cents. Even electric furnace scrap and specialties have been affected. The recent sale of about 5000 tons of closely inspected heavy melting steel at $15.75 has established the melting steel price range at $15.25 to $15.75, a drop of 25 cents. Railroad lists are heavier, and industrial scrap is beginning to move more freely. An exception is the scrap available from railroad car shop operations. Dealers are active in booking futures, and while some dealers are more interested in buying than selling, the market is under control of sellers. The downward movement, which started about two weeks ago with rejections of numerous carloads of country scrap by mills, is being furthered by the influx of outside scrap, although rejections are fewer. Most of the scrap which failed to pass inspection has been absorbed. Railroad malleable, rail crops, No. 1 wrought, iron axles, brake shoes, pipes and flues, shafting and other miscel-

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except Detroit where dealers' buying prices are shown

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	12.00 to 12.50
Boston, dealers	11.50 to 11.75
Boston, No. 2	10.00 to 10.50
Buffalo, No. 1	16.50 to 17.50
Buffalo, No. 2	14.75 to 15.00
Chicago	15.25 to 15.75
Cincinnati, deal.	13.00 to 13.50
Cleveland, No. 1	15.50 to 16.00
Cleveland, No. 2	15.00 to 15.50
Detroit, No. 1	13.75 to 14.00
Detroit No. 2	12.25 to 12.50
East Pa., del. mill	16.00 to 16.50
N. Y., deal., R. R.	12.50 to 13.00
N. Y., deal. yd.	8.25 to 9.25
Pittsburgh, No. 1	17.25 to 18.25
Pittsburgh, No. 2	15.50 to 16.00
St. Louis, No. 1	14.00 to 14.25
Valleys, No. 1	17.50 to 18.00

COMPRESSED SHEETS

Buffalo (dealers)	14.50 to 14.75
Chicago	13.75 to 14.25
Cleveland	15.00 to 15.50
Detroit	14.00 to 14.25
E. Pa. new mat.	15.00
Pittsburgh	17.50 to 18.00
Valleys	17.50 to 18.00

BUNDLED SHEETS

Buffalo	12.00 to 12.50
Cincinnati, deal.	10.75 to 11.25
Cleveland	13.00 to 13.50
Eastern Pa.	11.50 to 12.00
Pittsburgh	16.00 to 16.50
St. Louis	10.00 to 10.50

SHEET CLIPPINGS LOOSE

Chicago	9.00 to 9.50
Cincinnati	9.50 to 10.00
Detroit	9.00 to 9.25
St. Louis	10.00 to 10.50

STEEL RAILS, SHORT

Birmingham	14.00 to 14.50
Boston	10.50 to 11.25
Buffalo	19.50 to 20.00
Chicago (3 feet)	18.50 to 19.00
Chicago, 2 ft. and under	19.00 to 19.50
Cincinnati, deal.	18.50 to 19.00
Detroit	17.00 to 17.50
Pittsburgh (3 ft.)	19.50 to 20.50
Pittsburgh, 2 ft. and under	20.00 to 21.00
St. Louis	16.50 to 17.00

STOVE PLATE

Birmingham	12.50 to 13.00
Boston consumers	11.50 to 12.00
Buffalo	13.00 to 13.50
Chicago, net	12.75 to 13.25
Cinn., deal., net	9.25 to 9.75
Detroit, net	9.00 to 9.50
Eastern Pa.	12.50 to 13.00
N. Y. deal, mill	8.25 to 8.50
Pittsburgh	11.50 to 12.00
St. Louis	13.00 to 13.50

COUPLERS, SPRINGS

Buffalo	19.50 to 20.00
Chicago	17.00 to 17.50
Eastern Pa.	20.50 to 21.50
Pittsburgh	20.25 to 20.75
St. Louis	14.75 to 15.25

ANGLE BARS—STEEL

Chicago	17.50 to 18.00
St. Louis	14.50 to 15.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	19.50 to 20.50
Eastern Pa.	22.00 to 23.00
Pitts. billet and bloom crops	22.00 to 23.00
Cleve. billet and bloom crops	17.50 to 18.00

FROGS, SWITCHES, GUARDS

Chicago	16.75 to 17.25
St. Louis	15.00 to 15.50

SHOVELING STEEL

Chicago	15.25 to 15.75
Cleveland	11.75 to 12.00
Detroit	9.00 to 9.50
Pittsburgh	17.25 to 18.25
St. Louis	13.00 to 13.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.00 to 11.00
Boston, dealers	11.25 to 12.00
Buffalo, No. 1	13.50 to 14.00
Buffalo, No. 2	16.00 to 17.00
Chicago, No. 1	16.25 to 16.80
Chicago, No. 2	15.25 to 15.75
Cinn., No. 2	13.00 to 13.50
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 2	17.75 to 18.25
St. Louis, No. 1	13.50 to 14.00
St. Louis, No. 2	13.50 to 14.00

SPECIFICATION PIPE

Boston	10.50 to 11.00
Eastern Pa.	15.50 to 16.00
New York, deal.	11.25

BUSHELING

Buffalo, No. 1	14.50 to 15.00
Chicago, No. 1	13.50 to 14.00
Cinn., No. 1 deal	11.00 to 11.25
Cinn., No. 2	6.75 to 7.00
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	11.00 to 11.25
Detroit, No. 1	12.50 to 13.00
St. Louis, No. 1	10.00 to 10.50

MACHINE SHOP TURNINGS

Birmingham	7.00 to 8.00
Boston	6.50 to 6.60
Buffalo	7.75 to 8.00
Chicago	8.50 to 9.00
Cincinnati, deal.	8.50 to 9.00
Cleveland	9.50 to 10.00
Detroit	7.00 to 7.25
Eastern Pa.	11.50
New York, deal	7.50
Pittsburgh	10.75 to 11.25
St. Louis	8.00 to 8.50
Valleys	11.50 to 12.00

MIXED BORINGS, TURNINGS
For blast furnace use

Boston, dealers	5.75 to 6.00
Buffalo	11.00 to 11.50
Cincinnati, deal.	9.00 to 9.25
Cleveland	11.00 to 11.25
Detroit	9.25 to 9.75
Eastern Pa.	10.50 to 11.00
New York, deal.	7.00 to 7.25
Pittsburgh	11.50 to 12.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	7.00 to 8.00
Boston chem.	10.00 to 10.25
Boston, dealers	6.50 to 6.75
Buffalo	11.00 to 11.50
Chicago	10.00 to 10.50
Cincinnati, deal	9.00 to 9.25
Cleveland	11.00 to 11.25
Detroit	9.25 to 9.50
Eastern Pa.	11.00 to 11.50
Eastern Pa., chem.	14.50 to 15.00
New York, deal.	7.00 to 7.75
Pittsburgh	11.50 to 12.50
St. Louis	9.50 to 10.00

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	12.25 to 12.75
Chicago, net	12.50 to 13.00
Cincinnati	10.00 to 10.50
Eastern Pa.	12.50 to 13.00
New York, deal.	8.75 to 9.75
St. Louis	12.50 to 13.00

FORGE FLASHINGS

Boston, dealers	9.50 to 10.50
Buffalo	13.75 to 14.25
Chicago	10.50 to 11.00
Cleve. over 10 in.	14.00 to 14.50
Detroit	12.00 to 12.50

FORGE SCRAP

Boston, dealers	8.75 to 9.00
Chicago	18.00 to 18.50
Eastern Pa.	14.00 to 14.50

ARCH BARS AND TRANSOMS

Chicago, net	21.50 to 22.00
St. Louis	21.50 to 22.00

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal	6.75 to 7.00
Buffalo	14.50 to 15.00
Chicago	13.00 to 13.50
Cleveland	12.50 to 13.00
Eastern Pa.	15.00
Pittsburgh	15.75 to 16.75
St. Louis	10.00 to 10.50

STEEL CAR AXLES

Birmingham	17.00 to 18.00
Boston, ship point	17.00 to 17.50
Buffalo	19.50 to 20.00
Chicago	19.05 to 19.60
Eastern Pa.	22.75 to 23.00
Pittsburgh	21.50 to 22.00
St. Louis	19.00 to 19.50

SHAFTING

Boston, ship point	14.00 to 14.25
Chicago	17.10 to 17.65
Eastern Pa.	19.00 to 20.00
New York, deal.	14.50 to 15.00
St. Louis	18.50 to 19.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	11.00 to 12.00
Boston, iron	14.00 to 14.50
Buffalo, iron	14.00 to 14.50
Buffalo, steel	19.50 to 20.00
Chicago, iron	14.50 to 15.00
Chi., rolled steel	18.75 to 19.25
Cincinnati	12.50 to 13.00
Eastern Pa. cast.	16.50
Eastern Pa., rolled	20.50 to 21.50
N. Y., iron, deal.	12.00 to 12.50
Pittsburgh, iron	16.00 to 16.50
Pittsburgh, steel	20.25 to 20.75
St. Louis, iron	14.00 to 14.50
St. Louis, steel	17.00 to 17.50

No. 1 CAST SCRAP

Birmingham, cup.	13.00 to 14.00
Buffalo	16.00 to 16.50
Boston, textile	16.00 to 16.50
Chicago, mach.	16.80 to 17.35
Chicago, railroad	16.25 to 16.80
Chicago, agri.	15.70 to 16.25
Cincinnati, mach. cupolas, gross	19.50 to 20.00
Cleveland, cupola	16.50 to 17.00
Detroit, net	13.50 to 13.75
East, Pa., cupola	16.00 to 17.00
N. Y., cup., deal.	13.00 to 13.50
N. Y., del. local foundries	17.00
Pittsburgh, cupola	15.00 to 16.00
San. Fran., del.	13.50 to 14.00
Seattle	15.50 to 16.00
St. L. No. 1 mach.	15.25 to 15.75
St. Louis, No. 1	14.50 to 15.00
Valleys	16.50 to 17.00

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	13.00 to 13.50
Cleve., breakable	12.50 to 12.75
Detroit, auto, net	15.00 to 16.00
Detroit, breakable	9.50 to 10.00
Eastern, Pa.	15.50 to 16.00
New York, deal.	11.00 to 11.50
Pittsburgh	13.00 to 13.75

MALLEABLE

Boston, railroad	16.50 to 17.00
Buffalo	18.50 to 19.50
Chicago, agri.	16.00 to 16.50
Chicago, railroad	18.50 to 19.00
Cinn., R. R., deal.	15.25 to 15.75
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	16.00 to 16.50
Detroit, auto	15.00 to 15.25
St. Louis, rail	15.25 to 15.75

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	13.50 to 14.50
Skeleton, Boston	8.50 to 10.00
Rails scrap, Boston	10.50 to 12.00
Skeleton, Boston	8.50 to 10.00
Buffalo	16.50 to 17.50
Chicago	17.50 to 18.00
Eastern Pa.	18.00 to 18.50
New York	13.00 to 14.00
St. Louis	15.50 to 16.00

LOCOMOTIVE TIRES

Chicago, cut	18.50 to 19.00
St. Louis, No. 1	16.00 to 16.50

LOW PHOS. PUNCHINGS

Chicago	17.75 to 18.25
Pittsburgh	19.50 to 20.50

laneous grades have reacted to the general weakness.

Boston, May 21.—Conditions in the scrap market show but minor changes. Dealers having modified their rate for No. 1 machinery have found a better demand, shipping some round tonnages. There appears to be a ready Pennsylvania market for some lines at a price, but outgoing tonnage is limited.

New York, May 21.—Sales of turnings in eastern Pennsylvania at $11 delivered have resulted in a reduction here and the top dealers now are paying f.o.b., New York, is $7.50. Yard steel for eastern consumption also is off slightly at $8.25 to $9.25, f.o.b., New York, for shipment to eastern mills. Other prices on scrap in this territory are unchanged.

Buffalo, May 21.—Two representative sales of No. 1 heavy melting steel have been made here. Bethlehem has bought, and a consumer who does not receive No. 2 steel. The former's purchases were said to have been made at $16.50 for No. 1 and $15 for No. 2, while the latter is reported to have paid $17.25 for his grade. In these two purchases and one other sale of material to district steelworks at least 35,000 tons of scrap has been contracted for.

Philadelphia, May 21.—Dealer buying makes the principal activity in iron and steel scrap. Consumer buying is small, due to large stocks resulting from recent heavy shipments. While heavy melting steel has not been tested, the price based on dealers' selling prices is $16 to $16.50, delivered.

Pittsburgh, May 21.—Iron and steel scrap is slightly less active but prices are steadier in open-hearth grades. Heavy melting steel sold last week in moderate lots at unchanged prices. Dealers find no large tonnages available in attempts to cover contracts. Heavy mill buying also is lacking. Shipments and consumption are steady but mills are waiting for determination of the trend of prices and operations before buying heavily. Additional weakness is shown in steel specialties and low phosphorus grades, most of which are 25 to 50 cents lower.

Cleveland, May 21.—Continuance of the policy of one mill of bringing in large tonnages of scrap by boat and regulating daily rail shipments to a stipulated maximum weakens the local situation. Steel grades are substantially the same as a week ago in the absence of sales. Blast furnace material is down 25 cents, cast iron borings, mixed borings and turnings and No. 2 busheling now being quoted at $11 to $11.25. Dealers here are still paying $15.50 to $16 for No. 1 heavy melting steel, but in the Valley go as high as $18.

Detroit, May 21.—Shipments of scrap are heavy against orders booked for delivery by boat. New business is scarce and the price appears to be easing. Heavy melting steel is 25 cents lower, being now quoted at $13.75 to $14. Short shoveling turnings are down 25 cents to $9 to $9.50, while on loose sheet clippings $9.50 has disappeared, $9.25 being as high as dealers will go. Recent automobile lists brought relatively high figures, some bids being above the levels dealers will pay today.

Cincinnati, May 21.—The scrap iron and steel market is quiet and no tonnages of new business have been closed. Prices have steadied but the declining market has made dealers wary and buyers skeptical.

St. Louis, May 21.—Opinion on the iron and steel scrap market differs among dealers. Some see a firmer undertone and better demand, while others declare the situation is decidedly soft, with purchasing light and not likely to revive during the next four to six weeks. Where real tonnage changes hands, it is usually at concessions. Less distress scrap is appearing, railroads having lessened shipments, while the recent decline has served to curtail movement from country dealers.

Birmingham, Ala., May 21.—Dullness continues in iron and steel scrap, though heavy melting steel is finding a little demand, the best quality at $12.50 per ton with plenty obtainable. Prices are unchanged but weak.

Toronto, Ont., May 21.—While there was a slight lull in business in iron and steel scrap during the week, demand continues good. All grades are moving fairly freely, the strongest call for steel being chiefly from Montreal melters. Prices are firm and unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL
Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	6.00
Turnings	6.50
Heavy melting steel	8.00

TORONTO

Steel axles	15.00
Iron axles	17.00
Heavy melting steel	9.50
Turnings	7.50
No. 1 mach. cast (net)	16.00
Malleable (net)	14.00

Semifinished Steel

Market Continues Strong—New Sales Restricted

SEMIFINISHED STEEL PRICES, PAGE 1416

Pittsburgh, May 21.—Semifinished steel continues in a sellers' market. Lack of surplus supplies, however, continues to restrict new sales, although tonnage is moving steadily on contracts. Mills have little if any tonnage available for remainder of this quarter, and books have not been opened for the third period, although some inquiry has been received. No intimations are heard of a higher third quarter price than current quotations, although present levels represent an advance of $2 a ton over figures at which present contracts were made. The market largely is nominal but strong at $36 for 4 x 4-inch rerolling billets, slabs and sheet bars. Wire rods are firm at $42.

Philadelphia, May 21.—Billet makers are more generally quoting at the recent $2 advance, naming $36, base, Pittsburgh, for rerollers and $41 for forging quality. These prices now are representative.

Cleveland, May 21.—Demand for semifinished steel continues strong, the leading local producer continuing to operate all of its open-hearth capacity. Books have not been opened for third quarter, but the higher prices recently announced by Youngstown and Pittsburgh makers probably will be recognized. All of the second quarter output is covered by contracts booked before those prices were announced.

Youngstown, O., May 21.—Supplies of semifinished steel are none too plentiful in this district, although in no case is scarcity hampering finishing mill operations. A few inquiries for third quarter are appearing. Prices are steady.

Pig Iron

(*Concluded from Page* 1417)

The steady shipping orders constitute the most spirited activity in the market. Furnaces have been unable to lay down any stocks for many months. All available furnaces are operating, including three Iroquois and two Federal furnaces at South Chicago, and the Zenith stack at Duluth. The price is reported steady at $20, Chicago furnace, for the base grades.

It is estimated over 50 per cent of available merchant pig iron production for third quarter in this district has been sold. Production for the first five months this year set a new record. A cargo of English low phosphorus iron has arrived here, a large part of which is to be moved by rail to the Milwaukee district.

St. Louis, May 21.—New pig iron business is light, the total for the past week, 2500 tons, being the smallest for any similar period in months. The melt, while slightly below the April peak, holds up well, and is larger than at the corresponding time last year or in 1927. Prices continue firm.

Birmingham, Ala., May 21.—Spot orders for pig iron are more numerous, but surplus foundry iron on furnace yards is increasing. The probable make for June has been covered. No sales are reported for third quarter. Hope is expressed that readjustment of freight rates to eastern coast points will provide some business for this district. Prices are steady.

Toronto, Ont., May 21.—While spot sales of pig iron are holding at a satisfactory level, forward buying is quiet. Current sales are chiefly at $24.10, Toronto.

The Market Section

Bars

Demand Equals or Exceeds Shipments — Deliveries Much Deferred—Prices Remain Steady

IN SPITE of expected easing of demand and shortening of delivery delays mills are unable to make gains on backlogs. Specifications continue to equal shipments and in some cases to exceed them. At Chicago 14 weeks is required and at Pittsburgh three or four weeks. Third quarter books have not been opened, though there is some inquiry for that delivery being received.

BAR PRICES, PAGE 1415

Chicago, May 21.—Due to increase in spot sales in the week just closed, the indicated relief in deliveries of finished steel, particularly bars and plates, has been at least partially offset. Bar deliveries are extended as much as 14 weeks, with rolling schedules tight. Obligations on mill books show a decline commensurate with the drop in new buying, but this has not been reflected in easier deliveries. Specifications equal the weekly averages of this year, and overlap shipments. Consumers are operating with little visible supply of finished steel, several manufacturers in metalworking lines having only a week's stock ahead. The tapering in some lines of automotive production is not reflected in mill schedules or those of parts makers in this district.

Soft steel bars are quoted on a basis of 2.05c to 2.15c, Chicago, with much of the tonnage to miscellaneous buyers moving in a range of 2.05c to 2.10c. Third quarter books will be opened in about two weeks.

New York, May 21.—Steel bar specifications are running ahead of the April rate but less than the first quarter average. Some mills, on account of their sold-up condition, are taking only requirements of regular customers. Prices continue firm at 1.95c to 2.05c, base, Pittsburgh.

Pittsburgh, May 21.—Demand for hot-rolled merchant bars is practically equal to shipments. Demand so far this month has been surprisingly active and for a number of mills an improvement over the similar April period. Some inquiry is being received for third quarter but producers defer opening books. Some intimations are heard of an advance although no definite announcement is expected until late this month. Mills still have fair backlogs although delivery is slightly improved compared with a month ago. Shipments generally are three to four weeks with two weeks available in some instances. Little shading is noted of the 1.95c, Pittsburgh, price.

Detroit, May 21.—Releases for hot merchant bars in May have been measurably ahead of April for at least three representative steel companies supplying this market and is credited entirely to sustained demand of the automotive industry. While a recession is expected in June or July, it is not yet apparent. The 1.95c. Pittsburgh or Cleveland, mill price is firm and sellers here believe it would be a mistake to advance prices for third quarter. Some interest is shown in that period, with delivery dates fast encroaching upon it.

Cleveland, May 21.—Shipments of soft steel bars show little variation from a month ago. Automotive requirements are not off appreciably, and other users specify liberally for the season. Outside mills quote 1.95c to 2.00c, delivered Cleveland, and local mills asking 1.95c, base, Cleveland.

Philadelphia, May 21.—Steel bar specifications continue heavy with the current rate exceeding that of April. Prices are firm and unchanged.

Alloy Steel

Third Quarter Inquiry to Open Books —Market is 2.65c

Detroit, May 21.—Inquiries are beginning to appear in larger numbers for third quarter alloy bars. Makers probably will open books within 10 days for that period. In the meantime, specifications have slumped off somewhat. From some users, however, they are well sustained and the tonnage for April-May will be ahead of a comparable period a year ago. May tonnage is almost up to that for April. The present market base price of 2.65c, mill, is firm and probably will be carried along another quarter.

Plates

Smaller Volume of New Business Coming to Mills—100,000-Ton Pipe Line Order Slpit

NEW plate tonnage is lighter in volume, though there is not much improvement in deliveries. In the Pittsburgh district shipments have been further extended, to 60 days in some instances. Prices are steady. Four makers share in the order for 100,000 tons of pipe for a southern gas line. Freight car builders are taking heavy tonnages and barge builders order 1000 tons.

PLATE PRICES, PAGE 1415

Pittsburgh, May 21.—Delivery of plates is further extended, with recent buying in excess of shipments. Some mills are asking 60 days for delivery. Specifications so far this month have been more active than during the similar April period. Freight car builders are heavy consumers. Barge builders in this district have received orders recently for floating equipment involving around 1000 tons of plates, and a good volume of business remains pending. Plates are steady at 1.95c, Pittsburgh.

New York, May 21.—All plate producers continue to operate at capacity. Deliveries are slightly easier, demand not being as active as recently. The market is firm at 1.95c to 2.05c, base, Pittsburgh, or 2.05c to 2.15c, base, Coatesville, depending on which producing center gives the lowest delivered prices. There is considerable movement of plates for export to Canada and South America.

Cleveland, May 21.—Plate specifications are sufficient to maintain high operating rates at mills, with deliveries generally deferred three to six weeks. A local mill is on a 75 per cent operating basis and recently booked some attractive boiler tonnage for prompt shipment. Plates for the 500 steel automobile cars ordered by Union Pacific from the Ralston Steel Car Co., will be rolled by a large Pittsburgh interest. Books will be opened shortly for the third quarter, and some believe an advance of $1 per ton will be asked.

Detroit, May 21.—A contract has been let by the city for a water tunnel from an intake at the head of Belle Isle to Water Works park to W. S. Morrow & Co. on its bids of $639,263. Contract also was let to Julius Porath Inc. for a 54-inch pipe line involving about 1500 tons of plates at Eight-Mile road. Board of water commissioners has also approved preliminary negotiations with Ford Motor Co. for a 2-mile tunnel from the Detroit river to the Fordson plant, to be built by the company, title to pass to the city on completion. Plates are 1.95c, Pittsburgh.

Chicago, May 21.—More plate tonnage is being added to mill books through the award of 100,000 tons of pipe for a gas line from Louisiana to Birmingham and Atlanta. Of this order National Tube Co. booked 60,000

tons, and the remaining 40,000 tons went to Republic Iron & Steel Co., A. O. Smith Corp. and Spang, Chalfant & Co. The Milwaukee maker of electric welded pipe has placed additional tonnage with outside plate producers. Deliveries are unchanged, with the limitation at about 14 weeks. Specifications still are ahead of shipments, but obligations on mill books are being reduced because of the lighter buying. About 10,000 tons in oil tankage inquiry is pending. Old Dutch Refining Co. has been organized to build and operate a 3000-barrel refinery at Muskegon, Mich., which may be in operation by September. Plate prices are 2.05c to 2.15c, Chicago, to miscellaneous buyers. Single orders for as much as three carloads have been placed with warehouses because of tight deliveries. Third quarter books will be opened in about two weeks.

Philadelphia, May 21.—Plate orders booked recently by eastern mills have taken up the slack that was beginning to develop and some makers are unable to promise sheared plates in less than four weeks, or universals in less than two or three weeks. Prices continue firm.

CONTRACTS PLACED

1200 tons, 96-inch siphon, Belle Fourche project, South Dakota, to Pittsburgh-Des Moines Steel Co.

600 tons, plates and shapes, for merchandise barges for Louisiana & Arkansas Barge Line; to Dravo Contracting Co.

500 tons, plates and shapes, pontoons for Gahagan Construction Corp., New York; to Jones & Laughlin Steel Corp.

200 tons, derrick hull for New York State Canal commission; to Midland Barge Co.

175 tons, six tanks for Shell Oil Co., Seattle, to Western Pipe & Steel Co. and Western Engineering Corp.

CONTRACTS PENDING

575 tons, 24-inch welded steel pipe, Los Angeles; Western Pipe & Steel Co. low bidder.

Directors Ratify Merger

Directors of American Seeding Machine Co., Springfield, O., have ratified acquisition of the company by the Oliver Farm Equipment Co., Chicago. Directors of the Oliver company also approved issuance of 1300 additional shares of stock in connection with acquisition of a minority interest in Hart-Parr Alberta, Ltd., Calgary, Alta. Sales of Oliver Farm Equipment Co. in the first four months of this year are reported to show a satisfactory increase over the sales of the constituent companies for the corresponding 1928 period. The company is a merger of several farm equipment concerns. Tractor sales increased 56 per cent during that period.

General Brass Co., Detroit, has increased capital from 362,500 preferred and 60,000 no par value to 60,000 no par value and $908,692.

Pipe

Two Line Pipe Orders Totaling 120,000 Tons Let—Cast Pipe Operations Increase

LINE pipe once more takes precedence over cast by reason of the size of orders involved. A 100,000-ton order is divided among four sellers and a 20,000-ton order among two. Recent heavy demands for cast pipe enables northern plants to increase schedules by 20 or 30 per cent. Chicago has awarded 770 tons of 24-inch, but 819 tons at Sierra Madre, Calif., went steel.

PIPE PRICES, PAGE 1416

New York, May 21.—Heavy buying over the last few weeks has changed the situation at northern cast iron pipe foundries materially. Northern plants now are operating substantially at full capacity. In some cases they have enough business to keep them busy for two or three months. Low prices occasionally are heard but much less frequently. The market in general is fairly firm on the basis of $38 to $48, delivered New York, for 6-inch class B pipe. Considerable private buying continues to characterize the present demand and several large tonnages now are under negotiation with private buyers. New York department of water supply has placed a pipe job with the Gregory Contracting Co. and the 200 tons of pipe involved will be furnished by John Fox & Co.

Pittsburgh, May 21.—A portion of the pipe tonnage involved in the 1400-mile gas line of the Southern Natural Gas Corp. has been divided among four mills in this district and the Middle West. This tonnage represents only a small portion of the total, which is expected to be one of the largest individual lines ever placed. The remainder of the tonnage will probably be awarded soon. Merchant pipe continues to make moderate gains, with boiler tubing and mechanical tubing holding to their recent activity. No improvement is noted in the demand for seamless material from the oil country, with casing and drilling pipe moving rather slowly. Wrought iron pipe is in good seasonal demand and slightly more active than a year ago. Pipe mill operations are unchanged.

Cleveland, May 21.—Demand for tubular products for large buildings is at a low ebb but calls continue to be made upon pipe jobbers for household and other construction which in the aggregate amount to a fairly large tonnage. Jobbers continue to order usually in lots of one to three carloads at a time, both mill and plumbers' supply.

Chicago, May 21.—Tonnage of small diameter cast pressure pipe awarded this season is far below a year ago, but awards of larger diameter and centrifugal pipe are ahead of the 1928 rate to date. One foundry is sold up on centrifugal pipe for about two months. Carload orders run into fair tonnage. Larger foundries have backlogs sufficient for 80 to 85 per cent operations, as against 50 to 60 per cent several months ago. A flurry in inquiry for gas pipe from private companies is reported. One gas line project in western territory will have steel pipe competition. Shorewood, Wis., inquiries for 200 tons of 6 to 12-inch pipe. Chicago awarded 770 tons of 24-inch. Chicago delivered quotations are reported steady for the larger sizes in carload orders on the basis of $45.20 to $46.20, or $37 to $38, base Birmingham.

Birmingham, Ala., May 21.—New specifications for cast iron pressure pipe are not numerous but production is being held at about 85 per cent. Shipments are steady. Purchasing of pig iron by pipe foundries has not been active but the policy of buying against new needs in sight is being maintained. Shipment is greater than production now, but there is some stock on yards. Quotations are firm at $37 to $38 on 6-inch and over sizes.

CONTRACTS PLACED

STEEL PIPE

100,000 tons, gas line for Southern Natural Gas Corp., from Louisiana to Birmingham, Ala., and Atlanta, Ga., 60,000 tons to National Tube Co., and the remaining 40,000 tons to Republic Iron & Steel Co., A. O. Smith Corp. and Spang, Chalfant & Co.

20,000 tons, 125 miles of 20-inch pipe, Arkansas Gas Co., 75 miles (12,000 tons) to the A. O. Smith Corp., and 50 miles (8000 tons) to Youngstown Sheet & Tube Co.

CAST PIPE

770 tons, 24-inch pipe for Chicago, to Glamorgan Pipe & Foundry Co., at $45.45, delivered at site.

CONTRACTS PENDING

819 tons, 4 to 16-inch, class 150, Sierra Madre, Calif. Went riveted and lapwelded pipe.

338 tons, 4 to 12-inch class B, improvement municipal district No. 1, Southgate, Calif. Bids opened.

224 tons, 12-inch class B, improvement West Lake avenue north, Seattle. Bids opened.

200 tons, 6, 8 and 12-inch pipe for Shorewood, Wis.; bids May 20.

117 tons, 4 to 10-inch, class C, improvement La Jolla boulevard, San Diego, Calif. Bids June 3.

104 tons, improvement of Percy street, Yuba City, Calif. Bids May 28.

100 tons, class F pipe, mostly 16-inch for Milwaukee; United States Pipe & Foundry Co. only bidder at $48 per ton, less 2 per cent in

10 days, or $47, if awarded complete requirement.

April Sheet Shipments Set New Record

Sheet sales by independent mills decreased from a daily average of 14,977 tons in March to 13,273 in April. Production increased from 11,748 tons in March to 12,508 tons, and shipments advanced from 11,731 tons in March to 12,576 tons in April. The total tonnages for April were as follows: Sales 398,206; production 375,256 and shipments 377,274. The total of sales for April was below that for March. April output was the highest of any month since January. Shipments in April were the largest of any month on record. The National Association of Flat Rolled Steel Manufacturers' complete report for April follows:

	Net tons	Per cent of capacity
Total sales for April	398,206	122.3
Total production	375,256	115.2
Total shipments	377,274	115.9
Unfilled tonnage, May 1	835,801	256.8
Approximate finished stock on hand awaiting shipments	121,164	37.2
Approximate in stock unsold	54,142	16.6

Total number of hot mills in the United States is 722 having a capacity for April, 1929 of approximately 482,000 net tons and the percentage of the capacity to which the figures shown are related is 67.6.

A monthly comparison of sales, production and shipments follows:

	Sales	Production	Shipments
January, 1928	302,921	316,541	274,126
February	266,210	330,565	298,420
March	399,441	366,127	359,532
April	284,070	327,909	327,674
May	250,316	349,367	326,324
June	318,902	311,629	308,741
July	333,357	267,685	278,310
August	254,397	329,396	324,691
September	370,936	318,907	322,876
October	344,614	369,243	354,925
November	346,041	358,402	307,790
December	323,421	302,182	296,687
January, 1929	438,390	391,404	362,229
February	389,496	326,468	325,848
March	464,297	364,202	363,648
April	398,206	375,256	377,274

Daily averages for February, March and April, 1929 follow:

	Sales	Production	Shipments
February, 1929	13,910	11,659	11,637
March	14,977	11,748	11,731
April	13,273	12,508	12,576

Tin Plate

Books Opened For Last Half at Unchanged Prices

TIN PLATE PRICES, PAGE 1416

Pittsburgh, May 21.—Specifications for tin plate are slightly less active, although mills are well engaged in completing previous orders and operations are close to capacity. Weather conditions have been adverse recently but canmakers continue to look for substantial packs in leading vegetable crops. The leading tin plate producer has opened books for the last half at no change in the current price of $5.35 per 100-pound box, Pittsburgh.

Sheets

Books Opened for Third Quarter at Unchanged Prices, Except Blue Annealed

SHEET mills have opened books for third quarter, reaffirming second quarter prices on all grades, except blue annealed, on which the new classifications and prices apply. No change was made by leading producers in the Pittsburgh district on autobody sheets, though the price has not been clarified in some other districts. New business and specifications are well sustained.

SHEET PRICES, PAGE 1415

New York, May 21.—Eastern mills have followed the lead of the Inland Steel Co. in adopting two base prices on blue annealed sheets. Both Bethlehem Steel Co. and Alan Wood Steel Co. have announced the adoption of two base prices, quoting 2.20c, base, Pittsburgh, on blue annealed plates, and 2.35c, base, Pittsburgh, on blue annealed sheets. The 2.20c base price applies to No. 10 gage and governs the net price on gages No. 8, 9, 10, 11 and 12. The 2.35c base price applies to No. 13 gage and governs the net price on gages No. 13, 14, 15 and 16. A comparison of the new prices with the old, by gages, shows little change in the heavy gages, with the exception of No. 12 gage, which is advanced $1 a ton; on the other hand, the new prices on the light gages are $1 to $2 a ton higher than the old. This comparison, using Pittsburgh base prices, is as follows:

BLUE ANNEALED PLATES

Gage	Old price	New price
8	2.15c	2.15c
9	2.20c	2.20c
10	*2.20c	**2.20c
11	2.25c	2.25c
12	2.25c	2.30c

BLUE ANNEALED SHEETS

13	2.30c	**2.35c
14	2.30c	2.40c
15	2.40c	2.45c
16	2.40c	2.50c

*Old single base.
**New base.

The new method is not expected to have any effect on competition between the product of blue annealed jobbing mills and that of continuous hot strip mills. The strip mills make the same gages as the jobbing mills. As the continuous strip mills are particularly adapted to satisfying large tonnage requirements, it is thought these mills in the future as in the past, will continue to make a drive on the large requirements, such as those of the automotive industry.

Pittsburgh, May 21.—Sheet producers have opened their books for third quarter at prices unchanged from present levels, with the exception of a revision in the basing gage of blue annealed. This change, as announced a week ago by Inland Steel Co., makes No. 13 gage the new base instead of No. 10 gage. The price of the former gage is 2.35c, Pittsburgh, an advance of $1 a ton. Gages No. 12 and 15 also are advanced $1, gages No. 14 and 16 are advanced $2, while sizes 8, 9 and 10 are unchanged. Third quarter prices on black continue 2.95c, with galvanized 3.70c, tin mill black 3.00c and autobody 4.10c. Although some talk was heard of an increase in autobody, this has not materialized. New business and specifications have been well sustained recently, and despite a slowing down in commitments from automotive interests total sales have been running close to shipments. Sheet mill operations are steadier, slightly above 95 per cent.

Youngstown, May 21.—Sheet producers have opened third quarter books at prices unchanged from present levels. Establishment of the autobody price at 4.10c is expected to bring many new orders from users who have been anxious to get a place on mill books. All producers here have adopted the new blue annealed classifications which carry advances of $1 to $2 a ton on some gages. Third quarter prices of 2.95c on common black and 3.70c on galvanized would be equivalent to an increase of $1 to $2 a ton over some of the minimum prices reported on large second quarter contracts.

Cleveland, May 21.—Steel barrel manufacturers' requirements for sheets remain high. Other users are furnishing numerous orders, particularly stovemakers, builders of electric refrigerators and other household appliances and agricultural implement makers. Third quarter books will be opened soon. To hold to 2.95c on black and 3.70c on galvanized would virtually be an advance for some makers, as they have been accepting business $2 under those prices.

Detroit, May 21.—While orders for autobody sheets are being trimmed somewhat, other grades are holding up well. May aggregate tonnage promises to equal April's. Makers are catching up on their shipping schedules. In some cases the 2.95c, Pittsburgh, price on block has been supplanted by levels as much as $2 to $4 per ton lower. The same is practically true of galvanized. Full finished are firm at 4.10c.

St. Louis, May 21.—New buying of sheets continues in fair volume. Some falling off in specifications from the automotive industry is noted. Prices are unchanged.

Philadelphia, May 21.—Sheet specifications are reported heavier by some mills, and it is difficult to get prom-

(*Concluded on Page* 1431)

Structural Shapes

23,000-Ton Job Let in East—Bridge Work East and West Aggregates High—Outlook Bright—Prices Uniformly Firm

HEADED by a 23,000-ton elevated roadway for the west side of New York city, structural awards leap upward this week, aided by several other lettings involving 1000 tons or more at a time. Included is much bridge work, one lot let in the Middle West, involving 2800 tons. More bridges for the Missouri river territory are up and highway programs in Illinois, Indiana and Wisconsin undoubtedly will bring more to light later on. Transmission towers are in good demand on the Pacific coast, while on the Atlantic seaboard commercial construction is active and highway bridges are gaining large proportions. Mills report that specifications are well sustained and prices are firm in practically all market centers. Quotations are easy at Philadelphia.

STRUCTURAL SHAPE PRICES, PAGE 1415

New York, May 21.—Commercial construction in the metropolitan district is active with indications of further improvement. Industrial and residential building is relatively quiet. Many new highway bridge projects have appeared in the past few days. The contract for 23,000 tons for the west side highway construction was let to the Fort Pitt Bridge Works. The labor situation in New York has improved and the dispute between the Building Trades Employers' association and the Building Trades council seems in line for early settlement. Shapes hold steady at 2.195c to 2.245c, New York.

Boston, May 21.—About 1250 tons represented total awards to fabricators last week. A local building takes 550 tons. A state bridge at Richmond, Vt., involves 450 tons. A hospital unit here takes 250 tons. Pending items total 1000 tons including 550 tons for an addition to the Harvard university stadium at Cambridge, Mass.

Philadelphia, May 21. — Eastern shape mills continue to operate on heavy schedules, partly on requirements for other districts. In several cases, consumers in this district are complaining about difficulty in obtaining early shipments. Prices continued easy and unchanged.

Pittsburgh, May 21.—No marked change is noted in specifications for plain structural material although tonnage has improved slightly over the rate a month ago. Fabricators continue to report spotty business, with slowness noted in closing on pending work. Activity in this district is lagging behind the pace in other territories although a number of large projects are in prospect for some time this year. The rate of inquiry shows little change. Plain material is steady at 1.95c, Pittsburgh.

Cleveland, May 21.—Several jobs awarded involve less than 1000 tons apiece. Action on larger work is postponed. Some interference with the lakefront stadium, estimated to involve 8000 to 10,000 tons, defers action on it by at least a month. Wilbur Watson & Associates, engineers in connection with the hangar-building program of the Goodyear Tire & Rubber Co., Akron, O., have issued plans for nine hangars at strategic points such as Chicago, Dodge City, Iowa, Miami and St. Petersburg, Fla., Ft. Worth, Tex., Philadelphia, Boston and elsewhere, to take about 250 tons each. Shapes are firm at 1.95c, Pittsburgh, and some talk is heard of advancing that figure to 2.00c, Pittsburgh for third quarter.

Detroit, May 21.—Specifications for structural shapes from manufacturers rather than fabricators have lately been dominant. Trailer manufacturers, crane builders, producers of conveyor systems, all are buying well. Structural members also have been bought in fair tonnages for fabrication in their own shops by automobile companies, Ford Motor Co. for instance being in a position to take care of about 1500 tons monthly. Building construction of late has involved small individual lots. The 1.95c, Pittsburgh, price is holding, but bidding on work is extremely competitive.

Chicago, May 21.—Highway and railroad bridge work in western territory in addition to revived activity in certain building lines strengthens the structural steel outlook. Several weeks of heavy carbuilding specifications have helped lengthen deliveries on plain structural material to as much as 10 weeks. One producer has a closed schedule for nearly 30 days. A large amount of bridge work is shaping up in Missouri river territory, particularly in Arkansas. Important highway programs are ahead in Illinois, Indiana and Wisconsin. Stocks in yards of industrial users and building fabricators are light. The price range continues at 2.05c to 2.15c, Chicago, except for tonnage differentials. Third quarter book will be opened in about two weeks.

Awards Compared

	Tons
Awards this week	47,630
Awards last week	32,501
Awards two weeks ago	26,020
Awards this week in 1928	32,265
Average weekly awards, 1928	39,082
Average weekly awards, 1929	42,088
Total awards to date, 1928	786,536
Total awards to date, 1929	883,849

CONTRACTS PLACED

23,000 tons, westside highway construction, New York, to Fort Pitt Bridge Works, through James Stewart, general contractor.

2800 tons, highway bridge over Missouri river at Sioux City, Iowa, to Missouri Valley Bridge & Iron Works.

2000 tons, transmission towers, Southern California Edison Co., Los Angeles, to Emsco Derrick & Equipment Co.

1500 tons, transmission towers, Brazilian Hydro-electric Co., Rio De Janeiro, Brazil, to Pacific Coast Steel Co.

1300 tons, building, vocational school, Grand Rapids, Mich., to Russel Steel Construction Co.

1200 tons, warehouse Peoples Outfitting Co., Detroit, to Mahon Structural Steel Co.

1100 tons, University club, Philadelphia, to Shoemaker Bridge Co.

1000 tons, substations, Pennsylvania railroad, between Trenton, N. J., and Philadelphia, to Lehigh Structural Steel Co.

1000 tons, catenary towers, Pennsylvania railroad, between Trenton, N. J., and Philadelphia, to American Car & Foundry Co., previously reported to unidentified fabricator.

1000 tons, New York subway, miscellaneous work in Brooklyn district, to Bethlehem Steel Co.

1000 tons, highway bridges, Boston district, to Phoenix Iron Works.

800 tons, building, Olds Motor Works, Lansing, Mich., to Mahon Structural Steel Co.

800 tons, addition, B. F. Goodrich Rubber Co., Akron, O., to Berger Iron Works.

750 tons, addition to tube mill, Timken Roller Bearing Co., Canton, O., to McClintic-Marshall Co.

700 tons, building, Bell Telephone Co., Evansville, Ind., to Whitehead & Kales Co.

635 tons, building, United States Phosphoric Products Co., Tampa, Fla., to Ingalls Iron Works Co.

600 tons, locomotive sheds, Cleveland Union Terminals Co., Cleveland, to Massillon Bridge & Structural Co.

550 tons, building on Newbury street, Boston, to Levering & Garrigues Co.

505 tons, gymnasium (215 tons) and botany and zoology buildings (290 tons) Duke university, Durham, N. C., to Southern Engineering Co.

500 tons, substation at Newburg, O., Cleveland Electric Illuminating Co., Cleveland, to T. H. Brooks Co.

450 tons, state bridge, Richmond, Vt., to American Bridge Co.

400 tons, bridge work for Northern Pacific railroad, at St. Paul, to McClintic-Marshall Co.

400 tons, Pennsylvania railroad bridge, Dayton, O., to McClintic-Marshall Co.

400 tons, hangar, Curtiss field, Glenview, Ill., to Union Foundry Co., and Joseph T. Ryerson & Son Inc.

300 tons, La Salle college building, Philadelphia, to Shoemaker Bridge Co.

300 tons, highway bridges, Vermont, to independent fabricators at Pittsburgh.

300 tons, station, Pennsylvania railroad, Gibson, Hill, N. Y., to Phoenix Iron Works.

275 tons, transmission towers and bus structure, Puget Sound Light & Power Co., Renton, Wash., to Pacific Coast Steel Co.

270 tons, building, Automatic Fan & Bearing Co., Jackson, Mich., to Flint Structural Steel Co.

250 tons, building, Swedish Crucible Steel Co.,

Windsor, Ont., to Canadian Bridge Co., by Henry M. Freier, Detroit, architect.
250 tons, hospital unit, Boston, to New England Structural Co.
250 tons, addition, telephone building, Southern California Telephone Co., San Diego, Calif., to McClintic-Marshall Co.
240 tons, bridge, Michigan state highway department, Stanwood, Mich., to Massillon Bridge & Structural Co.
240 tons, addition to switch house, Fish street substation, Commonwealth Edison Co., Chicago, to Wendnagel & Co.
235 tons, packing plant, Red Salmon Canning Co. in Alasaka, to Truscon Steel Co.
225 tons, plant, Columbia Malleable Castings Co., Columbia, Pa., to A. B. Rote Co.
200 tons, highway bridges, New York state, to American Bridge Co.
150 tons, candy factory, Avalon boulevard, Los Angeles, to Pacific Iron & Steel Co.
150 tons, store building, Kresge Co., Saginaw, Mich., to Flint Structural Steel Co.
150 tons, plant addition, United Engineering & Foundry Co., Youngstown, O., to Guibert Steel Co.
125 tons, building, Multicell Radiator Corp., Lockport, N. Y., to Leech Steel Corp., Rochester, N. Y.
120 tons, building, American Fork & Hoe Co., Geneva, O., to Pittsburgh Bridge & Iron Works.
110 tons, office building, Alexandria, Va., to Shoemaker Bridge Co.
100 tons, addition, George warehouse, Wellsburg, W. Va., to Guibert Steel Co.

CONTRACTS PENDING

20,000 tons, open-hearth building, etc., Great Lakes Steel Corp., Detroit. Indicative drawings to be considered within a week or 10 days.
8000 tons, New York subway, section 6, route 7, Brooklyn, N. Y. Bids rejected.
7000 tons, 40-story Lefcourt building, Newark, N. J.
2000 tons (estimated) nine hangars, Goodyear Tire & Rubber Co., Akron, O. Wilbur Watson & Associates, engineers, Cleveland, have issued plans for erection in nine cities.
1000 tons, bridge, Baltimore & Ohio railroad, Newark, O. Bids being taken.
1000 tons, cantilever type bridge, Detroit River-Canada Bridge Co., Detroit, 1400-foot span from Grosse Ile to Amherstburg, Ont. Preliminary work started May 17.
935 tons, pier shed No. 48, San Francisco; bids opened.
600 tons, Bloomfield Bank & Trust Co., Bloomfield, N. J. Bids being taken.
600 tons, store, Kresge Co., Minneapolis.
550 tons, stadium addition, Cambridge, Mass. Bids being taken by Stone & Webster Corp., general contractor.
500 tons, plant Youngstown Steel Car Door Co., Youngstown, O. General contract for $750,000 plant let to Heller & Murray, Youngstown, general contractors.
500 tons, bridge, Pennsylvania railroad, Lemoine, Pa.; American Bridge Co. low bidder.
380 tons, catenary towers, Pennsylvania railroad; Phoenix Bridge Co. low bidder.
300 tons, Seventh street bridge, Union Pacific railroad, at Omaha, Nebr.
300 tons, building, Horn & Hardart restaurant, on Sixth avenue, New York. Bids being taken.
300 tons, garage, Quincy and Dearborn streets, Chicago. Plans being prepared.
300 tons, train shed canopies, Cleveland Union Terminals Co., Cleveland. Bids taken May 20.
250 tons, addition, Gabriel Steel Co., Detroit. Bids closed May 17.
200 tons, housing station, 100 Fifty-fourth street, New York.
200 tons, alterations, National Biscuit Co., Jamaica, N. Y.
161 tons, state bridge, Hartland, Vt.
150 tons, second unit, Continental Baking Co. plant, San Francisco; bids opened.
146 tons, state bridge, Rockingham, Vt.
100 tons, nurses' home at Children's hospital, Roxbury district, Boston.
100 tons, hospital building, Gardner, Mass.
Unstated tonnage, building, 251 West Forty-second street, New York.
Unstated tonnage, building, Taft school, Watertown, Conn.
Unstated tonnage, office building addition, Hilmur Realty Co., Fulton street, Brooklyn, N. Y.
Unstated tonnage, addition, General Electric Co., 114 West Thirteenth street, New York; Lockwood-Greene Co., 1 Pershing square, engineer.

Concrete Bars

Seasonal Improvement Seen in Lettings—Much Work Pending—Prices Firm

STEADILY increasing as the season advances, concrete bar lettings involve several attractive tonnages. Much work is pending in Chicago for grade eliminations, etc. Lettings fairly numerous in 100 to 500-ton range, topped by a 1600-ton school job at Philadelphia. Mills report sustained specifications. Prices firm in most market sections, rail steel still being unsteady at Chicago.

REINFORCING BAR PRICES, PAGE 1415

Chicago, May 21.—Reinforcing bar business in this district is showing a steady increase. Building figures released in the week just closed show a daily average of $2,008,400 in Illinois for the first five months of this year against a daily average of $2,931,600 for new construction contracted in the first five months last year. Railroad officials and county and state highway engineers have agreed on plans for seven grade separations in Chicago, to cost about $3,500,000, for completion in 1930. These will include concrete viaducts and subways. Several individual awards of over 500 tons have reached the active stage. Rail steel bar prices continue somewhat unsteady, but billet bar quotations are reported firm at 2.40c to 2.90c.

Boston, May 21.—Conditions show but little change in concrete bars. For half a dozen small bridges in Vermont about 200 tons will be required, while odd lot tonnages disposed of in the past week aggregated not more than 200 tons. Prices are firm.

Buffalo, May 21.—Demand for welded mesh for road building is heavy, contractors buying in carload lots. Deliveries consequently are large and new inquiry is constant. Two new projects involving in excess of 400 tons will reach steel purchase stage shortly. A Buffalo steelworks took the contract to provide an unnamed tonnage for the new 100 x 200-foot plant for Multicell Radiator Corp.

Pittsburgh, May 21.—Specifications for concrete reinforcing bars to local mills are heavy although activity is restricted in awards in this district. Local sellers report a fair volume of inquiry, accompanied by steady specifications. Some work in prospect for later in the year promises substantial tonnages. The market is steady at 2.30c, Pittsburgh, for cut lengths and 2.00c for stock lengths.

Cleveland, May 21.—Much work is in prospect which will require a large aggregate tonnage of concrete bars. Jobs let recently involve single carloads, for the most part, with one or two taking 100 tons or more. Locomotive repair shops at Collinwood and Linndale for the Cleveland Union Terminals Co. take 160 tons and went to Paterson-Leitch Co., through Aronberg-Fried Co., general contractor. Prices appear to be firming up a trifle.

Awards Compared

	Tons
Awards this week	4,436
Awards last week	2,700
Awards two weeks ago	9,218
Awards this week in 1928	7,695
Average weekly awards, 1928	6,189
Average weekly awards, 1929	6,240
Total awards to date, 1928	156,582
Total awards to date, 1929	131,046

CONTRACTS PLACED

1600 tons, Olney high school, Philadelphia, to Concrete Steel Co.
800 tons, apartment, Chicago, to Calumet Steel Co., through McNally & Quinn, general contractors.
321 tons, paving in Siskiyou county, Sacramento, Calif., to unstated interest.
300 tons, Reyburn building, Philadelphia, to Truscon Steel Co.
250 tons, garage, Lake street, Chicago, to Inland Steel Co.
185 tons, second unit, Continental Baking Co. plant, San Francisco, to Truscon Steel Co.
160 tons, locomotive repair shops at Collinwood and Linndale, O., Cleveland Union Terminals Co., through Aronberg-Fried Co., general contractor.
150 tons, building, Chicago City Bank & Trust Co., Sixty-third and Halsted streets, Chicago, to Concrete Engineering Co.
140 tons, store building, Marshall Field & Co., Evanston, Ill., to Calumet Steel Co.
130 tons, warehouse, Morton Salt Co., Chicago, to Jones & Laughlin Steel Corp.
100 tons, road work at Glenview, Ill., to Concrete Engineering Co.
100 tons, addition to switch house, Fish street substation, Commonwealth Edison Co., Chicago, to Concrete Steel Co.
100 tons, building for W. R. Hughes, Cincinnati, to Joseph T. Ryerson & Son Inc.
100 tons, school, Gear and Cook streets, San Francisco, to Pacific Coast Steel Co.

CONTRACTS PENDING

800 tons, warehouse for Sachs Quality Furniture Inc., New York. Reported let to Jones & Laughlin Steel Corp.
293 tons, bridge, Butte county, Sacramento, Calif.; bids June 4.
190 tons, (mesh), for Whitesville-Canisteo, N. Y., highway; Ingersol & Barhite, Medina, N. Y., low bidder.
149 tons, paving in Orange county, Sacramento, Calif.; bids June 4.
135 tons, (mesh), for Hornell-Canisteo, N. Y., highway; William L. Collins, Hornell, N. Y., contractor.
107 tons, tunnel, Vale main sanal project, Vale, Oreg.; bids June 14.

100 tons, canal project, Burley, Idaho; bids opened.

100 tons, pier shed No. 48, San Francisco; bids opened.

100 tons, Lafayette college building, Easton, Pa. General contract to James Stewart & Co.

Iron Ore

Supplies Low, but Shipments Continue Heavy

IRON ORE PRICES, PAGE 1416

Cleveland, May 21.—Lake Superior iron ore supplies at lower lake docks and furnaces were about 3,000,000 tons below normal May 1, but vessel shipments this month are far ahead of the average and will make up a large portion of the shortage. The market continues quiet, consumers having covered for the season. The Lake Superior Iron Ore association reports the amount of ore on hand at lower lake docks and furnaces May 1 was 15,929,901 tons, 3,540,280 tons less than on the comparable day of 1928. The average for some years past has been approximately 19,000,000 tons. The association's full report follows:

	Tons
Ore consumed in March	5,465,015
Ore consumed in April	5,417,491
Decrease in April	47,524
Ore consumed in April, 1928	4,781,205
Ore on hand at furnaces May 1, 1929	12,283,355
Ore on Lake Erie docks May 1, 1929	3,646,546
Total at furnaces and Lake Erie docks May 1, 1929	15,929,901
Total, May 1, 1928	19,570,181

Shape Shipments High

Washington, May 21.—Shipments of structural shapes in April at 304,150 tons were the highest of any month for the year, as the following comparison by the department of commerce shows:

	New Orders—Actual tonnage	New Orders—Per cent of capacity	New Orders—Computed tonnage	Shipments computed tonnage
1928				
January	175,987	55	211,750	204,050
February	221,836	69	265,650	173,250
March	215,395	67	257,950	227,150
April	196,958	61	234,850	238,700
May	256,525	80	308,000	261,800
June	249,045	78	300,000	261,800
July	246,561	77	296,450	265,650
August	293,819	92	354,200	288,750
September	265,610	83	319,550	273,350
October	207,696	65	250,250	319,550
November	199,129	63	242,550	281,050
December	198,445	64	246,400	277,200
Total, 1928		71	3,287,600	3,072,300
1929				
January	205,659	69	246,400	273,350
February	213,042	70	269,500	238,700
March	292,426	93	358,050	277,200
April	272,838	88	338,800	304,150

Reports received from April to December, 1928, were from 201 to 241 firms with a capacity of 308,000 tons to 322,000 tons.

Mexican Representation

The National Engineering Co., 549 West Washington boulevard, Chicago, is being exclusively represented on Simpson intensive sand mixers in Mexico by the Wells Fargo & Co. Express, S. A. at Mexico City.

Rails, Cars

Baltimore & Ohio Divides 3070-Car Order—Secondary Rail Tonnage Light—Wheel Bids Taken

EASTERN car shops and steel mills benefit most as the result of the 3-way division of 3070 cars by Baltimore & Ohio. Rock Island enters market for 300 gondola car bodies. Other car lettings are light. Railroads are calling for material on order. Chilean State railways want 12 locomotives. Secondary rail tonnage is meager but more is shaping up.

RAILROAD TRACK PRICES, PAGE 1416

Chicago, May 21.—One western road has added 1000 tons of secondary rail tonnage to western mill books. It is understood that additional secondary rail orders are shaping up. Railroads are pushing for shipments of rails and track fastenings due them for orders already placed. Track fastenings sales in the week just closed totaled about 3000 to 3500 tons.

Rock Island is inquiring for 300 gondola car bodies. It is not expected that any of the steel for the Baltimore & Ohio cars will be placed with western mills. The interstate commerce commission has authorized Chicago, Milwaukee, St. Paul & Pacific to issue $8,370,000 5 per cent equipment trust certificates in connection with the purchase of new equipment.

Philadelphia, May 21.—Carnegie Steel Co. is low bidder on wheels for 500 automobile cars for the Norfolk & Western. Bethlehem Steel Co. is low on the axles.

Pittsburgh, May 21.—More car orders have been entered on the books of local builders. The recent award of the Baltimore & Ohio railroad placed 2000 cars in this and the Johnstown, Pa., districts. Specifications for track fastenings are steady but new business is light. Some material still is pending for third quarter requirements for roads. Demand for tie plates and spikes for replacement is light, with railroads engaged largely in laying of new track.

CAR ORDERS PLACED

Baltimore & Ohio, 3070 cars as follows: 1070 gondolas to American Car & Foundry Co. and 1000 hoppers each to Standard Steel Car Co., and Bethlehem Steel Co.

Chicago, North Shore & Milwaukee, one caboose to American Car & Foundry Co.

CAR ORDERS PENDING

Chicago, Rock Island & Pacific, 300 gondola car bodies.

Navy department, Manila railway, 100 flat cars, 100 box cars.

Pennsylvania, three dining and four cafe cars.

LOCOMOTIVE ORDERS PENDING

Calumet & Hecla Consolidated Copper Co., one 2-6-0 locomotive.

Chilean State railways, 12, 4-8-2 engines, bids at Santiago, Chile, until July 5, plans at New York office.

Humble Oil & Refining Co., one 50-ton switch engine.

April Auto Production Sets New Record

Washington, May 21.—April production of automobiles both in the United States and Canada made another record by a decided gain over the all-time record set in March. In the United States 620,656 cars and trucks were made, exceeding by a large margin the March record of 584,907 units, according to the department of commerce. Canadian output was 41,901 units, as the following comparison shows:

	United States—Total	United States—Passenger cars**	United States—Trucks	Canada† Total
1928				
April	410,104	364,877	45,227	24,211
Total, 4 mo.	1,378,942	1,233,495	145,447	62,647
May	425,783	375,863	49,920	33,942
June	396,796	356,622	40,174	28,399
July	392,086	338,792	53,294	25,226
Aug.	461,298	400,593	60,705	31,245
Sept.	415,314	358,891	56,423	21,193
Oct.	397,284	340,146	57,138	18,536
Nov.	*257,140	217,454	*39,686	11,769
Dec.	*234,116	205,993	*28,123	9,425
Total, year	*4,358,759	3,827,849	*530,910	242,382
1929				
Jan.	*401,030	349,446	51,584	21,501
Feb.	*466,348	*407,816	*58,532	31,287
Mar.	*584,907	*515,174	*69,733	*41,901
April	620,656	538,679	81,977	41,901
Total 4 mo.	2,072,941	1,803,581	261,826	135,310

*Revised. **Includes taxicabs. †Reported by dominion bureau of statistics.

Consider Code for Scrap

Pittsburgh, May 21.—Dealers in iron and steel scrap from various sections will participate in a trade practice conference to be held here at the William Penn hotel, May 23. Charles H. March, member of the federal trade commission, will preside. The purpose of the meeting is to give those concerned the opportunity to consider ways and means for the elimination of unfair and inefficient practices from the industry and to adjust a code of ethics.

Detroit Alloy Steel Co., Detroit, has increased capital from 28,000 to 40,000 shares no par value and $100,000.

Strip

Deliveries Slightly Better as Specifications Ease—Mills Are Sold to Midyear—Prices Firm

SPECIFICATIONS for strip hold to a high level and are only slightly less than shipments. Some improvement in delivery has been made but still are deferred a month or more. Third quarter prices have not been set but must come out soon as present contracts will extend deliveries well past the second quarter. Automotive shrinkage is slight.

STRIP PRICES, PAGE 1416

Pittsburgh, May 21.—Strip steel producers report specifications are only slightly below shipments. The slower buying pace of the last month and a half has enabled producers to improve delivery although shipments still are deferred a month or more on all material. Some narrower sizes of hot strip are furthest extended and on practically all sizes mills are well sold until July 1. Producers defer announcement of third quarter prices although intimations continue to be heard of advances in line with the higher prices expected to be asked for semifinished material. The market is firm at 1.90c to 2.00c for the two sizes of hot strip and 2.75c to 2.85c for cold-rolled strip.

Youngstown, O., May 21.—Strip steel producers expect that books for third quarter will be opened in about 10 days. The likelihood of a price advance appears to be fading, although demand shows no signs of abating. Pressure for deliveries, in fact, is reported as great as at any time this year. Shipments on narrower widths are 12 to 14 weeks deferred and on wider strip 4 to 5 weeks. Production continues at capacity.

Cleveland, May 21.—While automotive tonnage in hot and cold strip steel has shown a slight tendency to shrink, particularly for use in late June or July, other consuming lines remain active. Deliveries on cold strips are four to five weeks deferred, as a rule, yet occasions arise where price concessions under the quoted market are made. The 1.90c to 2.00c, Pittsburgh, price on hot strip is firm. Makers must shortly yield to pressure to open books for third quarter, since deliveries on hot strip range from four to eight and in some cases of narrow, from 10 to 12 weeks.

Detroit, May 21.—Hot and cold strip steel for automotive use in June will apparently be in less demand than for May. Specifications by automobile companies already indicate smaller need. Buyers of large tonnages have been able to uncover price concessions and makers who maintain the full market prices have lost considerable tonnage and are able to operate their mills at only 50 to 60 per cent. Some sellers have large backlogs and delivery is four to five weeks or more deferred.

Chicago, May 21.—Consumption of cold rolled strip steel this month by automotive builders is expected to show a moderately heavy decline from the record April activity, although no appreciable effect has developed in current specification schedules. Cold rolled backlogs continue 6 to 8 weeks. Books have not been opened for third quarter, but it is indicated prices for that period will be named by June 1. The range of 2.75c to 2.85c, Pittsburgh-Cleveland, is quoted on orders of 3 tons and over. Hot rolled strip mills are operating virtually at capacity, with backlogs 3 to 6 weeks. Prices are unchanged.

Tutein Hearings Ended

New York, May 21.—Hearings in the controversy between E. Arthur Tutein Inc. and the Hudson Valley Coke & Products Corp. have been concluded. Attorneys' summaries are due May 27 and replies June 3, after which decision is to be made within one month by the board of arbitration of which Lewis K. Comstock is chairman.

Morse Chain Co., Detroit, has increased capital from 120,000 to 300,000 shares no par value.

Cold Finished Steel

Specifications Hold to Active Rate—No Third Quarter Sales

COLD FINISHED PRICES, PAGE 1416

Pittsburgh, May 21.—Specifications for cold finished steel bars are holding to the steady rate that has prevailed so far this month. Active specifications from automotive interests indicate heavy production schedules for motor car builders during June. Cold finished producers have not opened books for third quarter and contracts are not expected to be signed until after announcement of the hot-rolled bar price. The current market is steady at 2.30c, Pittsburgh.

Cleveland, May 21.—Little interruption has come to demand for cold finished bars. Some makers note a slight falling off in tonnage for use in late June or July, but expect that by that time specifying will be resumed. Books are not yet opened for third quarter but this shortly will be done.

Wire

Stocks Moving Well and May Promises to Exceed Last Year—Road Mesh Active

FENCING and road mesh for highway construction are active and bring a good total to wire manufacturers. Jobbers are moving their stocks well and this is reflected into further demands on mills. Some slight improvement in demand for nails is seen. Third quarter prices have not been announced but are expected soon. Current prices show no change.

WIRE PRICES, PAGE 1416

Chicago, May 21.—Wire mills report further slight gains in distribution of woven fencing. Jobbers are liquidating stocks at an encouraging rate. Indications are that May tonnage will be heavier than a year ago and the heaviest May in several years. Manufacturers' wire is holding up well. Quotations to large jobbers are reported steady at 2.55c, Chicago or western mills, for bright plain wire, and $2.70 for wire nails.

Buffalo, May 21.—Wireworks continue on large production schedules and demand for the general wire line, including mesh for road construction is good. The price situation is firm.

Pittsburgh, May 21.—Wire business is holding at about the rate noted earlier this month, the only change being a slight improvement in nail demand. Manufacturers' wire continues at the steady rate of a number of weeks. Fencing material is fairly active. Price announcements for third quarter are lacking although producers are expected to open books soon.

Cleveland, May 21.—Wire for manufacturing purposes is in heavy demand. Wire nails are moving poorly through jobbers but at a fair rate direct to users. Wire mill operations average 80 per cent. All prices are firm.

Detroit, May 21.—Wire orders are fairly numerous but nail business lags, especially from jobbers. Nails, however, are being bought more freely by automobile companies for crating automobiles for export. Prices are firm.

Nonferrous Metals

Demand in General Is Light and Prices Fairly Steady—Shipments and Consumption at Near High Record Rates

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin—New York Spot	Straits Tin—New York Futures	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
May 15	18.00	18.00	17.50	44.25	44.37½	7.00	6.65	6.62½	23.90	8.87½	35.00
May 16	18.00	18.00	17.50	43.87½	44.00	7.00	6.70	6.62½	23.90	8.87½	35.00
May 17	18.00	18.00	17.50	43.80	43.92½	7.00	6.75	6.62½	23.90	8.87½	35.00
May 20	18.00	18.00	17.50	44.00	44.12½	7.00	6.75	6.62½	23.90	8.87½	35.00
May 21	18.00	18.00	17.50	43.87½	44.00	7.00	6.75	6.62½	23.90	8.87½	35.00

NEW YORK, May 21.—Buying of nonferrous metals has continued quiet during the past week. Price changes also have been narrow. Shipments and consumption of metals appear to remain near the high records established in the past few months. Specifications against old orders continue to be made at an active pace.

Several factors are causing some uncertainty in the market at present. Among them are the reparations negotiations in Europe and interest rates on loans in this country.

Copper—Light sales have been made at 18.00c, delivered Connecticut, in the past few days. Export sales also have been small. The total domestic and export buying, however, has been large enough to keep the custom smelters from becoming overly anxious. The custom smelters continue to be the only class of producers in the market. Prices have remained firm. Other producers have sufficient business on their books to be able to remain out of the market for a time. It is generally believed that export business will become more active within the next few weeks.

Zinc—Sales of prime western have been slightly more active the past week, mostly at 6.60c to 6.65c, East St. Louis. A small amount may have been sold at slightly less than these prices and also as high as 6.80c. Most producers are not pushing the market. The ore market is steady at $44 a ton.

Tin—Prices continued to fluctuate in a quiet market during the past week. Some uncertainty among producers and consumers has been apparent. Straits shipments during the first half of May totaled 4613 tons in accordance with previous estimates in the trade. Domestic shipments this month are expected to be large.

Lead—A stronger undertone in the market has become evident in the past week. Prices have become somewhat firmer with producers in general quoting the 6.80-cent level but with some metal sold at a smaller figure. The lead ore price is unchanged at $90 a ton.—*Daily Metal Trade.*

Coke By-Products

Good Demand Continues in All Lines —Prices Unchanged

New York, May 21.—Demand for light oil distillates continues heavy. Most producers' stocks are low, with production only slightly ahead of buying. Some actual shortages in toluol are noted but these are more artificial than natural, as apparently there is enough to meet monthly consuming requirements. It is when too many shipments fall upon one date that difficulty arises.

Sulphate of ammonia is quiet, with domestic market holding at $2.20 to $2.30, delivered, and the export market at nominally $2.20, port for material in double bags. Sellers look for little improvement before the latter part of June, when the fertilizer industry may be expected to contract its season's requirements.

Naphthalene demand is moderately active, with the drug trade still rounding out its seasonal requirements. Prices are steady.

Mill Products

Base price cents per pound f.o.b. mill, except where otherwise specified

SHEETS	
Yellow brass (high)	23.25
Copper, hot rolled	27.75
Lead, full sheets (cut ¼c more)	10.00
Zinc sheet (100-pound base)	$10.25
Zinc strip (100-pound base)	$9.25
Aluminum, flat sheets, up to 10 gage, 3 to 72 inches wide	31.30
SEAMLESS TUBE	
Yellow brass (high)	28.25
Copper	29.25
RODS	
Yellow brass (high, full turnings)	21.25
Naval brass	24.00
WIRE	
Copper	19.87½
Yellow brass (high)	23.75

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	12.00 to 12.50
Chicago	11.50-nominal
Cleveland	12.25 to 12.50
HEAVY YELLOW BRASS	
Cleveland	8.75 to 9.00
ZINC	
New York	3.50 to 3.75
Cleveland	3.25 to 3.50
HEAVY COPPER AND WIRE	
New York	14.00 to 14.25
Boston	13.50 to 14.00
Chicago	12.50-nominal
Cleveland	13.50 to 14.00
RED BRASS BORINGS	
New York	11.00 to 11.50
YELLOW BRASS TUBING	
Cleveland	8.50 to 9.00
LIGHT COPPER	
New York	12.00 to 12.25
Chicago	11.50-nominal
Cleveland	12.00 to 12.50
LIGHT BRASS	
Boston	8.00 to 8.50
Chicago	7.50-nominal
Cleveland	6.75 to 7.00
ALUMINUM	
Clippings, Cleveland	18.00 to 18.50
Borings, Cleveland	9.50 to 10.00
Cast, Cleveland	13.00 to 13.50
Cast, Boston	10.50 to 11.00

Secondary Metals

Remelt aluminum No. 12	17.00 to 17.50
Brass ingot, 85-5-5-5	16.25 to 16.50

Coke Oven By-Products

Per Gallon at Producers' Plant in Tank Lots

	Spot
Pure Benzol	$0.23
90 per cent benzol	0.23
Toluol	0.40
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17
Per Pound at Producers' Plants	
Naphthalene flakes	0.05½ to 0.06½
Naphthalene balls	0.06½ to 0.07½
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.20 to 2.30

Arranging Two Meetings on Pressed Metal

The Pressed Metal institute is planning two meetings for June; the New England group to meet in Bridgeport, Conn., June 7, and the Western group in Youngstown, O., June 14. Because of the interest in predetermining the deep drawing qualities of steel, this subject will have a prominent place on the programs of both meetings. Representatives of steel mills will present their experiences and others who have worked along this line will participate also.

Arrangements are being made in both Bridgeport and Youngstown to visit a rolling mill. These meetings will be open to representatives of stamping plants. Malcolm Baird, 232 Delaware avenue, Buffalo, is secretary of the Pressed Metal institute.

Quicksilver Inactive

New York, May 21.—Quicksilver is quiet and unchanged at $123 to $123.50 a flask.

Warehouse

Building Needs for Steel Met in Many Sections by Jobbers—Weather Hurts Sale in South—Prices Generally Are Firmer

BUILDING programs in the eastern, northern and western sections cause much buying of material from warehouse. In the Cincinnati and more southern territories cold weather is delaying outside work but this is only damming up a good demand for June. Prices generally are firm, only occasional concessions being granted when tonnages favor that move.

Chicago—Steel warehouse sales are in heavier volume than a year ago. Individual orders are increasing, some running as high as three carloads of stock sizes at a time. Bars, sheets and plates are active, demand for plates having increased with the extension of mill backlogs. Prices are unchanged.

New York—Demand for finished steel products, particularly sheets and structurals for shipment out of warehouse stocks here continues unusually good for this season. Prices are firm generally, except on sheets.

Philadelphia—Jobbers are experiencing continued good demand. Current bookings are above the April rate. Prices are firm and unchanged.

Buffalo—Warehouses report a continuation of the large tonnage movement noted since April 1. Steelworks schedules continue badly congested and warehouses are profiting thereby. Reinforcing bar demand is good and other materials hold their own.

Pittsburgh—Warehouse sales show little change from a month ago. Compared with last year, however, most products are more active. Current demand reflects the inability of mills to make prompt shipments. Prices are well maintained throughout the list, with shading less noticeable.

Cleveland—Sales continue active from warehouses as applying to all items carried, in most cases exceeding the high April rate. Prices are firm. Sheet jobbers are a unit in quoting the new prices on black and galvanized sheets, i.e., 3.90c and 4.75c for No. 24 gage.

Cincinnati—Damp weather, slowing up outside work, has caused a drop in warehouse business. Much business is in sight, however, and tonnage may rise shortly. Prices continue firm.

Detroit, May 21.—Jobbers fully expect May to exceed April if buying from their stocks continues through the month at the first half rate. Tonnage is mounting, warehouses benefitting from deferred mill deliveries. Since the inauguration of new quantity extras on cold rolled steel, sales have increased, although the extras involve a price increase.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.75c
Houston	3.00c
Los Angeles	3.30c
New York ††‡‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.75c
New York††	2.80c to 3.24c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.95c
Cincinnati	3.15c
Cleveland	2.25c to 2.44c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl.	2.65c
Los Angeles, lcl.	3.00c
New York	2.90c to 3.30c
Philadelphia	2.75c to 3.10c
Pittsburgh	2.90c to 3.175c
San Francisco cl.	2.00c
San Francisco lcl.	2.25c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York†††‡‡	3.25c to 3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.30c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.60c
Boston 3/16-in.	3.915c
Buffalo	3.50c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.70c to 3.90c
Portland	3.75c
Philadelphia*†	3.25c
Pittsburgh**	3.35c to 3.45c
San Francisco	3.80c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.34c

NO. 24 BLACK SHEETS

Baltimore	3.50c to 4.00c
Boston	4.85c
Buffalo	4.20c
Chicago	4.05c
Cincinnati	4.05c
Cleveland***	3.90c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York	3.90c to 4.00c
Philadelphia*†	4.10c
Pittsburgh**	3.85c
Portland	4.90c
San Francisco	4.90c
Seattle	5.00c
St. Louis	4.25c
St. Paul	3.89c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore	4.30c to 4.50c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.90c
Cincinnati	4.90c
Cleveland***	4.75c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.30c
Los Angeles	5.30c
New York	4.65c to 4.75c
Philadelphia*†	4.85c
Pittsburgh**	4.85c to 4.95c
Portland	5.50c
San Francisco	5.30c
Seattle	5.50c
St. Louis	5.10c
St. Paul	4.68c
Tulsa	5.10c to 5.35c

BANDS

Baltimore	4.00c
Boston	4.015c to 5.00c
Buffalo	3.65c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c to 3.65c
Detroit, 3/16-in. and lighter	3.30c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	3.75c
Philadelphia*	3.15c
Pittsburgh	3.25c
Portland	4.00c
San Francisco	3.75c
Seattle	4.00c
St. Paul	3.50c
Tulsa	4.50c to 4.69c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	3.75c
Cincinnati	4.05c
Cleveland	3.25c to 3.65c
Detroit, No. 14 and lighter	3.80c
New York‡‡	4.25c
Philadelphia*	3.40c
Pittsburgh	4.25c
Seattle	5.00c
St. Paul	4.00c

COLD FINISHED STEEL

	Rounds, hexagons,	Flats, squares
Baltimore (c)	3.50c(a)	4.00c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.60c	4.10c
Philadelphia*	3.60c	4.10c
Pittsburgh	3.70c	4.20c
Portland (a)	4.50c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.64c	5.14c

(a) Rounds only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pound lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.15c

(b) Net base, straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL

New York duty paid

Hollow drill steel	13.00c
Iron bars, round	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. †† Domestic bars. **Less than 25 sheets. *†50 or more bundles. ***Less 0.15c where more than 10 bundles are ordered at once for delivery at one time.

Pacific Coast

Demand Holds Well with Numerous Large Lots Placed—Prices Firm

SOME slackness has been noted on the coast but sufficient large projects are under way to provide a large tonnage of bookings each week. Varied demands are pending and continued large buying seems assured. Finished steel leads activity and pig iron and coke buying are slack. Some imported iron is on order for nearby delivery. Prices show no weakness.

Seattle, May 15.—Inquiry for iron and steel products in the Pacific Northwest is fairly well maintained although delay in awarding a number of large contracts has featured the situation. General business conditions are good, construction is active and much public work is yet to be awarded.

Architect E. J. Bresemann, Perkins building, Tacoma, is preparing plans for $150,000 hospital for the state at Retsil. Bids will be opened in 60 days.

Pacific Telephone & Telegraph Co. is considering three suitable sites for a proposed 36-story headquarters building in Seattle.

Blue prints and data are being prepared for the proposed $3,835,000 bridge at St. Johns, Oreg., over the Willamette river. Formal application is about to be filed with federal officials.

Bids will be opened by Seattle May 31 for a $1,000,000 tunnel, 2100 feet long, in connection with the city's hydro-electric development at Diablo on the Skagit river.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	25.00 to 26.00

*C.i.f. duty paid.

Pig Iron and Coke

Plants are well stocked with pig iron, having purchased generously before the recent advance. No. 1 Columbia is quoted at $27 with some firms contracted under that level. Orders have been placed for a limited quantity of Burn iron for future delivery. British coke is arriving frequently and stocks are well maintained. One local plant has purchased a small lot of beehive coke at $14.

Bars, Plates and Shapes

Awards of plates, shapes and bars have been limited this week but several large contracts are pending. Mill prices are unchanged at 2.35c, reinforcing material continuing firm at 2.30c.

Local steel mills have booked a number of orders in carload lots and operations are unchanged. Business pending includes 2500 tons of reinforcing bars for the Lake Cushman project. Three Seattle jobs, the County-City building, Garfield street bridge and Spokane street viaduct, involving a total of nearly 2500 tons of reinforcing bars have been postponed but will probably be awarded within 60 days.

Shell Oil Co. has awarded contracts for one 82,000-barrel and four 26,000-barrel tanks, involving a total of about 175 tons of plates. The Western Pipe & Steel Co., San Francisco, will construct the larger tank and the Western Engineering Corp., Seattle, the four smaller. Call for bids for Everett's water pipe line will be issued in about 90 days. This project involves 20 miles of 52-inch steel pipe, a storage dam and two tunnels, 11,000 feet in length. Barr & Cunningham, Portland, engineers, are preparing plans.

Finished Materials

Wholesalers report an active demand. Materials required in general construction and public work are being handled in large volume while the agricultural sections are buying more freely. Prices are unchanged.

Old Materials

Steel scrap is unchanged at $10 and $11, gross, at local mills. Supplies are arriving in large volume and stocks are increasing. Bids for the purchase of 3500 tons of railroad scrap, including 350 tons of rail, have been rejected by the Alaska railroad and new tenders will be received next month. This material is in Alaska, delivery at Anchorage or Seward. Cast iron scrap is reported at an average price of $14 net ton but the market is somewhat weaker as supplies are larger and foundries are buying only for immediate requirements.

Good Tonnages Placed

San Francisco, May 18.—(*By Air Mail*)—Although demand for some lines of steel products is less, shapes, bars and plates are active and some large lots have been placed this week, including 1000 tons of bars in Seattle, 1200 tons of plates in Denver and 1000 tons of shapes for a plant in Seattle.

Little of real importance has taken place in the markets for foundry coke and pig iron and sales and inquiries continue to involve small lots. Prices are unchanged.

Concrete bar awards this week aggregated 1588 tons. The Truscon Steel Co. took 185 tons for a factory in San Francisco and the Pacific Coast Steel Co. booked 1000 tons for bins in Seattle for a flour company. Pending business includes 442 tons for two paving projects for the state of California, bids on which open June 4 and 107 tons for a canal project at Vale, Oreg. Prices on carload lots of reinforcing steel bars in the San Francisco and Los Angeles districts continue around 2.30c, base, with 2.60c applying on less than carload lots. Demand for merchant bar material continues limited to small lots. Prices on this form of steel are firm at 2.35c c.i.f.

Plate awards this week exceeded 1400 tons and brought the total for the year to 63,886 tons, compared with 14,056 tons for the same period a year ago. The largest letting was taken by the Pittsburgh-Des Moines Steel Co. and called for 1200 tons for a siphon for the Belle Fourche project in South Dakota. No award has yet been made on 13,200 tons for two boats for Matson Navigation Co. Western Pipe & Steel Co. was low bidder on 575 tons for a 24-inch welded pipe line for Los Angeles. Prices appear firm at 2.35c, c.i.f.

Demand for structural shapes continues strong and awards this week aggregated 6142 tons. So far this year 86,276 tons have been booked, compared with 60,789 tons for the corresponding period in 1928. Pacific Coast Steel Co. booked 1500 tons of transmission towers for the Brazilian Hydroelectric Co., Rio De Janeiro and 275 tons for the Puget Sound Light & Power Co., Renton, Wash. Emsco Derrick & Equipment Co., which heretofore has specialized on oil-well derricks, booked 2000 tons of transmission towers for Southern California Edison Co. Other awards of importance included 300 tons for a power plant at Renton, Wash., and 1000 tons for a factory in Seattle, both taken by Hofius Steel & Equipment Co. Pending business exceeds 17,000 tons and includes 6800 tons for two boats for Matson Navigation Co. and 935 tons for a pier shed in San Francisco. Plain domestic shapes are firm at 2.35c c.i.f.

Other Finished Material

Although a fairly large sized tonnage of cast iron pipe is pending, awards this week were limited to one or two projects, totaling less than 1300 tons. The American Cast Iron Pipe Co. booked 900 tons for a timber company at Klamath Falls, Oreg., and 150 tons for Victoria, B. C. Pending business exceeds 4000 tons and includes 117 tons for San Diego and 338 tons for Southgate, Calif. So far this year 38,228 tons have been placed, compared with 36,048 tons for the same period last year. Crane Co. took 288 tons of 5 to 14-inch welded seamless steel tubing. Southern Counties Gas Co. placed 1348 tons of 6⅝-inch line pipe with an eastern mill. Los Angeles will open bids next week on 195 tons of 24-inch lapwelded pipe and has opened bids on 575 tons of 24-inch, $\frac{5}{16}$-inch thick lapweld or electrically welded steel pipe.

American Foundry Party Arrives in London

London, May 21.—(*By Cable*)—Members of the American Foundrymen's association arriving here to attend the third International Foundrymen's congress, June 11-15, were officially received by British foundrymen at Hotel Cecil yesterday morning. Wesley Lambert, president-elect, Institute of British Foundrymen; H. G. Sommerfield, honorary secretary, London branch of the institute; S. T. Johnston and Fred Erb, president and president-elect, American Foundrymen's association, spoke. The only other official arrangement this week is a dinner of welcome at the Holborn restaurant, May 23, upon invitation of Sir Hugo Hirst, chairman, British General Electric Co. Speakers will include Sir Hugo and W. B. Lake, president, London branch, Institute of British Foundrymen, for the British and S. T. Johnston and H. Cole Estep, chairman, committee on International relations, American Foundrymen's association, for the American delegation.

Power Group Schedules Boston Meeting

The Power Transmission association will conduct its first Boston regional meeting at the Boston chamber of commerce on the evening of June 7. The purpose of the meeting is to inform industry of the scope and possibilities of mechanical power transmission equipment and the recent and proposed activities of the association. The program will be featured with an entertainment program as well as addresses and discussions of transmission problems. W. S. Hays, Drexel building, Philadelphia, is secretary of the association.

Conference Board Elects

Officers of the National Industrial Conference board, New York, for the coming year have been announced as follows: Honorary chairman, Frederick P. Fish, Fish, Richardson & Neave, Boston; chairman, Charles Cheney, president, Cheney Bros., South Manchester, Conn.; vice chairman, Irenee du Pont, chairman, finance committee, E. I. du Pont de Nemours & Co., Wilmington, Del.; vice chairman, Cornelius F. Kelley, president, Anaconda Copper Mining Co., New York; vice chairman, Herbert F. Perkins, first vice president, International Harvester Co., Chicago; vice chairman, Matthew S. Sloan, president, New York and Brooklyn Edison Companies, New York; president, Magnus W. Alexander, 247 Park avenue, New York; and treasurer, Fred I. Kent, director, Bankers Trust Co., New York.

Canton Sheet Mill Will Be Improved

Canton, O., May 21.—Canton Rolling Mills Co. is being organized to take over and revive the old Carnahan plant of this city, sold recently at public auction, according to Alvin L. Bear, Bear Steel & Wire Co., Chicago, one of the principals of the new company.

A fund of $200,000 has been provided for improvements. Present plans call for addition of two hot mills to the eight now in the plant. These mills will be driven electrically. The mills will handle sheets up to 24 inches. The 10 cold mills purchased with the plant will complete the mill equipment for the present.

The annealing furnaces will be enlarged and equipped for gas operation. William Martersteck, who was associated with construction work on the Massillon mill of the Central Alloy Steel Corp., Mark plant of Youngstown Sheet & Tube Co., and the Mercer works of the American Sheet & Tin Plate Co. will supervise rehabilitation.

An annual production of 75,000 tons is contemplated, largely full-finished sheets, long ternes, polished stove and enameling sheets, and electrical sheets.

Plans include development of a semi-continuous process through the use of hot strips, as well as sheet bars, both of which will be purchased from nearby producers.

Copper Concerns Merge

Chase Companies Inc., which owns Chase Brass & Copper Co. and allied interests, has consolidated with the Kennecott Copper Corp., a large producer of copper. Directors of the Chase Companies Inc., at a meeting in New York, May 20, concluded the merger. Assets of the combined companies will be close to $300,000,000. The Chase interests have been building a large plant at Cleveland the past few months.

Keep Kalamein Standard

Washington, May 21.—Announcement has been made by the simplified practice division, department of commerce, that the standing committee has reaffirmed the existing schedule, without change, for another year, of recommendation No. 83, kalamein doors.

Operating Rates

Pittsburgh 95, Chicago 98, Youngstown Near Capacity

Pittsburgh—Steelmaking operations hold at their previous peak of about 95 per cent. Slightly heavier bessemer production compared with a month ago offsets a decrease in open-hearth operations. Finishing mills hold closely to previous rates, sheet production being between 95 and 100 per cent, with tin plate only slightly below capacity. Strip mills continue full. Pipe mills hold at 55 to 60 per cent for welded material and 75 to 90 per cent for seamless.

Buffalo—Steelworks operations continue to approach normal capacity. At the beginning of the week 33 of 37 open-hearths were making steel. Present production rates, Memorial Day excepted, will continue for several weeks at least.

Youngstown—Steel production by valley mills this month will come close to setting a new record for May. Of 51 independent open-hearth furnaces in the district, 49 are scheduled this week, one less than the previous week. Operations will average around 90 per cent. Bessemer production consists of two 10-hour turns at both independent plants, bringing production to about 80 per cent. Several independent sheet and tin plate producers continue to operate at capacity. Independent bar mills operate at 80 per cent. Of the 125 independent sheet units, 114 are scheduled. Carnegie Steel Co. tin and bar mills operate at 90 per cent. Strip mill output continues close to 100 per cent and pipe production averages about 60.

Chicago—Maintaining the 98 per cent rate, operations are unchanged at practical capacity. No reduction is seen for the remainder of this month. With much open-hearth furnace repair work completed it is probable the ingot rate may be slightly advanced. Twenty-nine of the 36 blast furnaces are blowing. The leading interest has ten active at Gary, nine at South Chicago and one at Joliet. Plate, bar and hot strip mills continue at capacity.

Sheets Continue Active

(*Concluded from Page* 1423)

ises of delivery in less than three to four weeks. Galvanized continue 3.60c to 3.70c, base, Pittsburgh; black 2.85c to 2.90c, and blue annealed 2.10c to 2.20c. Some mills have started to quote on new dual basis for blue annealed, though not generally established.

Chicago, May 21.—Sheet mills have taken a little third quarter tonnage on the basis of prices just announced. Quotations for black and galvanized are unchanged, and blue annealed are on the new base of 2.30c, f.o.b. mills for Nos. 9 and 10 blue annealed plates, and 2.45c, mills, for No. 13 blue annealed sheets. Mill backlog extends six to seven weeks in all grades. Specifications are coming in at a steady rate.

Warehouse Trade Seems Bright for Future

Washington, May 21.—In addressing the opening session of the 3-day annual convention of the American Steel and Heavy Hardware association at Hotel Washington here today, President H. A. Sadler, Sioux City Iron Co., Sioux City, Iowa, said the past year was the best in several. Future warehouse trade is bright and he believes the position of the jobber is better defined. About 125 members of the association are in attendance.

B. R. Sackett, secretary-treasurer, in his report reviewed the accelerated steel business and accumulating backlogs which have forced orders into warehouses. A survey shows that many members charge interest on past-due accounts. Mr. Sackett told about the "stocked and goods wanted" bulletins inaugurated by the organization and said that the Hardware association has worked with the National Association of Purchasing Agents in fostering buying and selling standards. He urged members to verify reported price cuts before meeting them. Concluding, he reviewed wholesalers' attitude on resale prices.

M. Markham Flannery, director, trade practice conference division, federal trade commission, Washington, stated that associations help the government as well as business and that a trade practice conference simply means self regulation.

Pipe Industry Reports Business as Spotty

Members of the National Pipe and Supplies association held their twentieth annual convention May 13-15 at Pittsburgh. The report on general business conditions in the pipe industry showed a rather spotty condition with an unsatisfactory status in a large number of states. C. F. Harvey, A. Harvey's Sons Mfg. Co., Detroit, was elected president for the ensuing year. Other officers elected are as follows: First vice president, J. H. Borton, Hajoca Corp., Philadelphia; second vice president, J. C. McEwen, Davies Supply Co., Chicago; while secretary Kennedy Hanson of Pittsburgh and Treasurer H. L. Andrews, Anchor Sanitary Corp., Pittsburgh, were re-elected.

A trade practice conference was held May 22 by committees representing the Central Supply association, Eastern Supply association, National Pipe and Supplies association, Southern and Southwestern Wholesalers' association, Western Supply association and the federal trade commission.

Made General Manager of Ward Sales

W. H. Morris, for five years Cleveland district manager of sales for Columbia Steel & Shafting Co., Pittsburgh and Carnegie, Pa., and also manager at Cleveland for the Edgar T. Ward Sons Co., has been transferred to Pittsburgh and promoted to be general manager of sales for Edgar T. Ward Sons Co. division of Columbia Steel & Shafting Co. He has been identified with these interests for the past 15 years, having been representative at Detroit for the Pittsburgh Shafting Co., a predecessor company, before locating in Cleveland.

J. W. Sutton, formerly assistant district manager of sales for the Columbia company at Cleveland, now becomes district manager of sales.

H. K. Hamilton, identified with the company for about 12 years at Dayton, O., latterly as manager there, will be manager at Cleveland for Edgar T. Ward Sons Co.

Furnace Builders Group Adopts Objectives

Members of the newly organized Industrial Furnace Manufacturers association held a meeting in Pittsburgh recently at which time the objectives of the organization were defined as follows:

"To promote and further the interests of industrial furnace equipment manufacturers in their engineering, manufacturing, sales, patents and other industrial problems.

"To collect and disseminate information of value to its members for the purpose of attaining improved production, proper use and increased distribution of industrial furnaces.

"To appear for its members before the legislative committees, governmental bureaus and other bodies in regard to matters affecting the industry."

Among original members of the association are Surface Combustion Co., Rust Engineering Co., Holcroft & Co., Chapman-Stein Co., Costello Engineering Co., George J. Hagan Co., William Swindell & Bros. and W. S. Rockwell Co. C. F. Cone, George J. Hagan Co., Pittsburgh, is the secretary.

Domestic Producers Renew Plea for Higher Manganese Ore Duty

WASHINGTON, May 21.—Requests of domestic producers of manganese ore for an increase of one-half cent per pound in the duty, which is now 1 cent per pound, was renewed last week when a committee of members of congress from 20 states having deposits of ore appeared before the house ways and means committee.

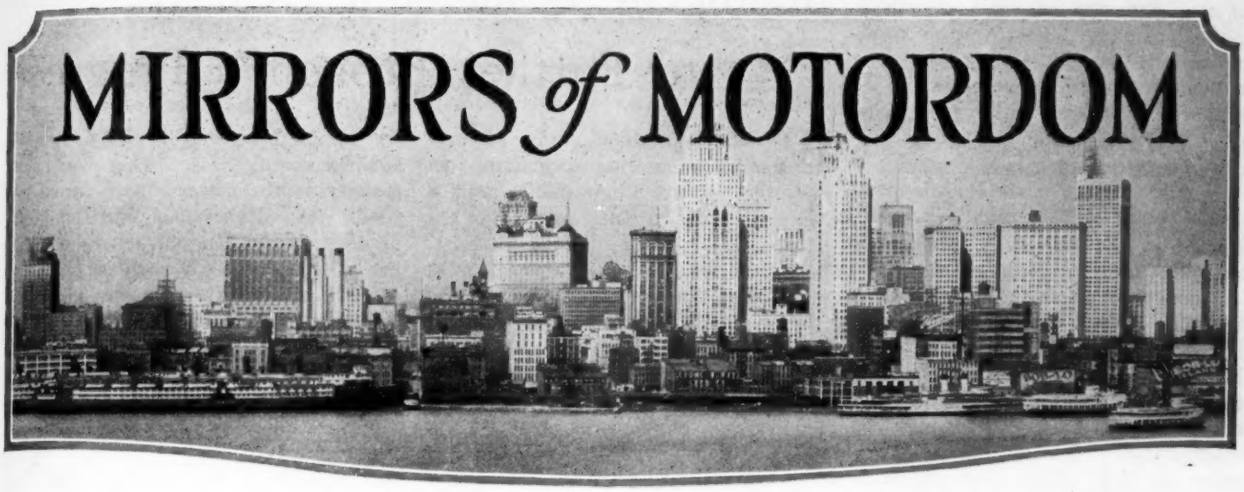
As spokesman for the committee, Representative Scott Leavitt, of Montana, said that "manganese from Russia is fast invading the American market and retarding the production of American ores. If the duty on the metallic manganese content of ores is not increased to 1½ cents per pound the principal beneficiary will be the treasury of the Russian government."

Leaders of the house of representatives now believe the bill, revising the tariff act of 1922, will be passed by the house next Tuesday or Wednesday. All of last week Republican members of the house ways and means committee held executive sessions at which proposed amendments were considered. This was a new development in tariff legislation, and apparently was designed to adjust differences without an open fight. It is believed that the committee will complete its work today or tomorrow with a Republican caucus probable for Wednesday and amendments proposed on the floor Thursday of this week.

Representative Isaac Bacharach, of New Jersey, chairman of the subcommittee on metals of the house ways and means committee, states he has been unable to make any progress in revising paragraph 312, dealing with structural steel. Mr. Bacharach believes the metals schedule will be passed in substantially the same form as it was reported by the committee. On the floor of the house Mr. Bacharach recently explained the metals schedule, the following being part of his address:

The total production of iron and steel products at present is valued at about $3,000,000,000 a year. Approximately 360,000 persons are employed. The domestic production of steel (about 51,650,000 tons during 1928) constitutes about 43 per cent of the world's output. The industry has developed throughout the history of the nation and is now considered, as a whole, highly efficient and on a

(*Concluded on Page* 1435)



Steel Corp. to Make Lake Shipments of Products

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Auto Production May Be Exceeding Record April

Detroit, May 21

UNITED STATES STEEL CORP. is turning to the Great Lakes for the movement of steel. Within a few days the Illinois Steel Co. will begin making shipments of its products, principally sheet bars and structural shapes at the outset, from the Chicago district to Detroit. There is a strong probability that the Carnegie Steel Co., at Pittsburgh, will match this development with westbound shipments. Whether other subsidiaries of the Steel corporation, especially the American Sheet & Tin Plate Co., the National Tube Co. and the American Steel & Wire Co., also will resort to the lakes is not now known.

Apparently Detroit, on account of its dominant position among consuming cities on the Great Lakes, will be the focal point of this water movement, but the program of the Steel corporation is believed to envisage a complete water service wherever demand and transportation costs warrant. Heretofore independent producers at Lake Erie ports, notably the Bethlehem Steel Co. from its Lackawanna plant at Buffalo, have monopolized this field.

It is almost incongruous that the Steel corporation, with the largest bulk freighter fleet on the Great Lakes and a steamship line moving steel in the export trade, including products from lake ports to Canada, must use other bottoms for this new lake service. But the Steel corporation's ownership of railroads makes it impossible, under the Panama Canal act, for it also to make deliveries in its own ships on the Great Lakes.

* * *

THIS decision by the largest producer of steel in the United States should give tremendous impetus to the lake movement of steel and will probably also revolutionize the pricing of steel in the lake cities. The corporation has the Illinois Steel Co. plants on the lakefront at South Chicago and Gary, with American Bridge, American Sheet & Tin Plate and American Steel & Wire plants adjacent to the waterfront, thereby making an excellent base of operations for the western portion of the lake district.

On the river at Lorain, O., are works of the National Tube Co. and on the river at Cleveland is a plant of the American Steel & Wire Co. The corporation's own railroad, with a lake terminus at Conneaut, O., provides an outlet for the various subsidiaries in the Pittsburgh and Youngstown districts. Thus the Steel corporation has three bases on Lake Erie.

* * *

LAKE transportation of steel is a logical and economic venture, of which the resort to it is proof, but the saving over all-rail shipments is not so great as cursory examination would indicate. At both ends of a water haul there are switching and dock handling charges, with the water rate proper in the middle. Then the buyer, or the producer, must have ample storage space, as a cargo of steel is quite different from a carload. For the consumer who lays down steel in his yard there is also a charge for picking it up. Nevertheless, the movement is cheaper to some points.

As tonnage is diverted from cars to vessel holds, Pittsburgh, Cleveland and Chicago base prices will mean less. At present there are no fixed water rates comparable to those filed with the interstate commerce commission. In effect, each cargo of steel is a separate consignment, and the rates vary according to conditions, including the possibility of a return load. Eventually delivered prices based on an approximate water rate doubtless may gage the steel market at Detroit.

* * *

MEANWHILE, the Detroit district is making slow but steady progress in the upbuilding of its own steel industry. Foundation work is under way at both the Great Lakes Steel Corp. plant at Ecorse, Mich., and the Newton Steel Co. plant near Monroe, Mich. In both cases the swampy character of the soil has hindered work. Within a few days structural steel fabricators should have definite drawings covering the 20,000 tons of structural material for the Great Lakes plant.

The Great Lakes plant at the outset will be self-contained from open hearth furnaces to finishing mills, and

one of the best corps of engineers in the steel industry has been organized by the company. The Newton project initially visualizes only the production of full finished sheets but a tentative program calls for open hearth furnaces and strip and bar mills five years hence.

Reports will not down that a blast furnace plant will eventually be constructed in the vicinity of the Newton mill. General Motors Corp. officials deny any plans in this direction. Lawrence Fisher, of the Fisher Body unit of General Motors, now owns about 1000 acres south of the 500 acres in the Newton site, and some believe a personal venture may be contemplated. One of the Hanna stacks at Zug Island, Detroit, from which the Great Lakes plant will take hot metal, will be enlarged, it is understood.

* * *

WHILE here and there deflections in automobile production are occurring, Dodge, Chrysler, Hudson-Essex and one or two others having periods when May achievements do not come up to intentions as forecast in April, others are exceeding their April outputs, which in turn exceeded those of March. With an April aggregate of 662,557 cars and trucks for the United States and Canada facing it, May already bids fair to exceed that record-breaking figure. Ford, which made 190,388 in April, has 200,000 scheduled for May; Chevrolet, which made 157,137 last month, intends to build at least 160,000 this month; Hudson-Essex, with 44,447 to its credit in April, is putting forth its best efforts on a 1900-daily schedule this month to exceed that figure, although as indicated it has short periods when that schedule is not possible of realization. The Chrysler-Dodge, Plymouth-DeSoto grouping, which made 59,785 in April and has a 60,000 schedule for May, finds its effort hampered by the Dodge unit, where men were laid off temporarily last week.

* * *

PACKARD MOTOR'S diesel-engined airplane burning fuel oil is said to be 25 per cent more economical than gasoline-burning types. Fuel costs for a 7-hour flight last week from Detroit to Langley field are reported to have been only $4.80. This is said to have been the first public demonstration of an oil-burning plane and witnessing airmen described the flight as perfect. Packard's plant here for the production of these engines is to be completed about the middle of July, and as soon thereafter as machinery and equipment can be installed, production will get under way.

Intelligent Leadership Held Key to Further Economic Progress

BROADER understanding of economic forces, more general cooperation in avoiding pitfalls, and a larger measure of self-restraint on the part of all elements of the business, financial and industrial world, have resulted in the period of 1922 to the beginning of 1929 being of unusual stability as well as of intense activity. This balance has been maintained in the face of a "spotty" spread of national progress, and in spite of unusual conditions, both national and international, arising out of peacetime readjustments.

These views are expressed by the committee on recent economic changes of the President's Unemployment conference in a report analyzing and interpreting surveys of recent economic life. The report and surveys, the latter compiled by the National Bureau of Economic Research, appear in a two-volume book, "Recent Economic Changes."

The committee report discusses such phases as widespread benefits of productivity, the speed which power has added to production, the spread in the source and use of credit, price relationships, wages and the cost of living, relative price stability, production increase and the expansion of human wants, mass services, and economic balance.

It sounds a warning note that future progress must depend on informed, intelligent leadership, aware of "the relations of the parts, each to the other," upon "incessant observation and adjustment," through which "we can learn to maintain the economic balance."

Changes since 1922 have been marked by breadth and scope of intensified activity rather than by changes in structure, says the report. The use of power has risen three and three-quarters times faster than the growth in population. Technical advances have made power available over a wide section for industry, the farm and the home. This has enabled "Manufacturers and farmers to meet high labor costs" by the use of specialized machinery. The unskilled worker has been transformed into a skilled worker by specialized automatic machinery and processes, with production unit costs lowered, drudgery eliminated, and wages maintained or increased.

In this period, savings of the people have increased from about 2,000,000 to 17,000,000 the number of Americans investing in the country's business enterprises. This contrasts sharply with former periods when funds were often inadequate for business expansion. In addition to supplying America's needs, several billions of dollars were loaned abroad. Recently, the committee notes, there has been a tendency for investors as well as a large body of speculators to invest "through the stock exchanges not only their savings, but the proceeds of loans" secured through banks and brokers. The result has been "an appreciable increase in the rate of interest for business purposes". The consequence of this can not be measured at this time.

One of the "striking and significant developments" which gives the period its "distinctive character" is in the field of price relationships, wages and the cost of living. Where between 1896 and 1913 the price level rose 2.3 per cent a year, it declined 0.1 per cent a year between 1922 and 1927. In the former period the purchasing power of wages rose but 0.5 per cent a year; in the latter it rose 2.1 per cent a year. The synchronization of a high wage level and a stationary cost of living "had widespread influence on the whole economic situation."

The committee recalls post-war talk of "liquidation" of labor, which "might have precipitated a period of serious strife" but for leaders of industrial thought who noted that high wages were stimulating purchasing and that these wages and accumulated savings were being poured into the channels of commerce. This was accelerating productivity. These leaders "began consciously to propound the principle of high wages and low costs as a policy of enlightened practice" which has attracted world attention, and constitutes "one of the fundamental developments in our economic system during recent years."

Partly as a result of this, a marked increase in the physical volume of productivity resulted from 1922 to 1929, with two years showing minor recessions. While other prosperous periods of our history many have surpassed the rates of increase in manufacturing, transportation and agriculture, "none, so far as the committee can learn, has shown such a striking increase in productivity per man-hour." Per capita productivity was nearly 60 per cent greater than in the late '90s, and in manufacturing gained 35 per cent from 1922 to 1925.

Still Urge Higher Duty on Manganese Ore

(*Concluded from Page* 1432)

sound economic basis. Although profits have been low during recent years, they show a tendency to increase.

There are, however, some maladjustments of classification and rates, and since 1922 there have been advances in metallurgical practice and changes in economic conditions of the industry which prompted careful consideration from a tariff standpoint. The advantages which European producers of iron and steel enjoy as a result of low costs for labor and transportation have been accentuated since the war by the modernization of many old plants, the building of new plants, the general adoption of more efficient methods of operation, and the organization of many producing units into cartels. A few domestic iron and steel products meet severe competition, particularly along the seaboards, and it has developed that some rates are not in line with the general rate structure applying to iron and steel products. Consequently the readjustments indicated below have been made with a view toward mitigating existing inequalities in competition, without materially affecting the general level of rates imposed by the schedule.

Pig Iron Output Declining

The domestic manufacture of iron in pigs—paragraph 301—with which the imported product comes into direct competition is a declining industry. United States production of iron in pigs has declined from 9,523,855 tons in 1913 to 7,723,676 tons in 1928. More than one-half of the merchant blast furnaces are idle. Imports were 132,568 tons in 1927 and 140,694 tons in 1928. The rate of $1.12½ per ton proclaimed by the president has been incorporated.

Paragraph 301 also provides for scrap of iron or steel and its phraseology was revised to provide for the assessment of additional duties on alloy metals contained in such scrap in line with duties on alloys in other paragraphs. Tungsten steel scrap, worth about 6 cents per pound in Europe, has been imported in substantial quantities at the same rate of duty as ordinary steel scrap, which is obtainable at less than 1 cent per pound in the United States.

Sponge, or granular iron, which is made by the low temperature reduction of iron ore, is a comparatively new product in the United States, and is not specifically mentioned in the present act. As it is somewhat similar in use and value to that of muck bars, phraseology descriptive of this commodity has been introduced in paragraph 303. The phraseology was also changed to include small pieces of muck bars manufactured for use in making steel and heretofore dutiable as scrap iron.

Concrete reinforcing bars are mentioned by name at the rate which was originally assessed in paragraph 304.

Paragraph 305 of the present act provides cumulative duties on all alloy steels and additional duties on certain alloying materials in excess of stated amounts in such steels. In order to carry out the established policy of special tariff treatment for alloy steels, the provisions have been expended in this bill to embrace the entire range of alloy materials and the products of which they are important components, and the minimum dutiable alloy content has been altered in conformity with present metallurgical practice. The act of 1922 provides only for alloys contained in steel. Recently, however, alloys contained in iron, such as stainless iron, are of increasing importance. The phraseology of the present bill has accordingly been changed to provide for alloys contained in iron. Provision has been made also for assessing higher rates of duty on chromium or vanadium contained in steel or iron because of the growing industrial importance of such steels and irons, and because of pressure on domestic markets from foreign sources. The rates are compensatory for the rates on chromium and vanadium provided in paragraph 302.

Imports under paragraph 312, "structural shapes," have increased from $131,669 in 1919 to $5,377,129 in 1928, and constitute the bulk of the rolled steel imported. About 99 per cent of imports under the paragraph consist of structural shapes, concrete reinforcing bars, and sheet piling. The rate now in effect is one-fifth of 1 cent per pound, a lower rate than is assessed on plain steel bars in paragraph 304. As such imported reinforcing bars have consistently undersold the competing domestic articles, the product was mentioned by name under paragraph 304, where the rate will be three-fifths of 1 cent per pound.

Imports of cast-iron pipe have become an important factor in the domestic market in recent years, and amounted in 1928 to $1,789,732. The imported pipe, largely from France, has the advantage of production at a low cost in a completely integrated plant and the benefit of relatively low transportation costs to the seaboard markets of the United States. The ratio of imports to domestic production was slightly over 6 per cent in 1927, and the effect of the low prices at which the product is sold is serious. The rate on such pipe has been increased from 20 to 30 per cent.

Necessary Changes Made

The phraseology in the iron and steel schedule has been changed only where necessary to (1) minimize the incentive toward litigation, (2) clarify the intent of Congress, (3) insure the assessment of the alloy metals at the proper rates of duty, (4) mention new products, such as sponge iron, by name, and (5) to provide specifically for products which have been the subject of litigation, or which have been imported in such quantities as to warrent increases in rates. The changes introduced are designed to more nearly equalize competitive opportunity, particularly in markets near seaboard, and to adjust certain rates which are now inconsistent. The adjustments do not affect the great bulk of the trade in iron and steel products.

The use of alloys has expanded considerably and new alloys have been developed since 1922. The structure of the tariff rates on alloys in the act of 1922 involved the relationship existing between the content of the alloy material in the ore, in the alloy, and in the finished alloyed product. Changes in basic rate would therefore ordinarily involve corresponding changes in the related rates. The only change found necessary in the rates of duty on the ores from which alloying metals are produced is in the rate on tungsten ore. A small increase in this rate is advisable in view of the difference in cost of production here and abroad—as tentatively determined by the tariff commission—and the large ratio of imports to domestic production. Advances in metallurgical practice have been such as to obviate the necessity for corresponding changes in the rates on tungsten alloys.

April Foundry Equipment Orders Record

Cleveland, May 21.—Orders for foundry equipment declined moderately in April, from March although they were the highest of any April since the Foundry Equipment Manufacturers' association began compiling statistics. Shipments for the month were 220.3, with unfilled orders 363.4 and gross orders for three months averaged 193.0, taking the average of 1922-1924 as 100. Comparisons follow:

	1926	1927	1928	1929
Jan.	168.2	180.4	132.7	180.5
Feb.	154.9	198.0	123.6	197.0
Mar.	157.3	131.1	138.6	209.4
Apr.	113.2	130.1	107.7	172.6
May	128.5	134.3	335.6	.....
June	133.5	138.4	149.1	.....
July	127.3	89.9	94.8	.....
Aug.	141.2	106.4	278.0	.....
Sept.	114.0	80.4	170.0	.....
Oct.	140.5	98.0	185.0	.....
Nov.	133.4	95.8	197.8	.....
Dec.	181.0	106.8	166.5	.....

Base: Average monthly shipments for 1922-23-24.

April Stoker Sales Up

Washington, May 21.—Sales of mechanical stokers as reported to the department of commerce for April gained sharply over both March, 1929, and April, 1928. Four-month totals show an increase of 18 per cent over the opening four months of 1928. Comparisons follow:

	Stokers sold	Fire tube boilers	Water tube boilers
1928			
April	88	21	67
Total (4 mos.)	371	98	273
May	130	43	87
June	162	78	84
July	186	67	119
August	162	57	105
September	161	68	93
October	100	48	52
November	116	54	62
December	102	34	68
Total (year)	1,490	547	943
1929			
January	97	36	61
February	80	26	54
March	117	42	75
April	141	41	100
Total (4 mos.)	435	145	290

Industrial Men in the Day's News

Prof. Comfort A. Adams, Awarded Miller Medal

RECIPIENT of many other honors, he receives the initial Samuel Wylie Miller medal award for meritorious achievement in welding.

THOUSANDS of engineers the country over feel indebted to his keen intelligence and kindly interest while under his tutelage at Harvard university.

ORGANIZER and first president of the American Welding society, his real interest in welding began during the World war.

IN RECOGNITION of his many achievements in the art of welding and because of his meritorious services rendered that profession, Comfort Avery Adams, Lawrence professor of engineering, Harvard university, Cambridge, Mass., was recently awarded the first Miller medal at the recent annual meeting of the American Welding society in New York. This medal was established by the late Samuel Wylie Miller and is awarded for meritorious achievement contributing conspicuously to the advancement of the art of gas or electric welding.

Professor Adams was born at Cleveland in 1868. He early showed an aptitude for the mechanical arts and took an engineering course at Case School of Applied Science. Cleveland. After graduating he was called to the instructors' staff of his alma mater, and realizing the importance of instructing young engineers he decided to make that his life work. That this was a wise choice, is shown by the many honors bestowed upon him, and no less by the high regard in which he is held by literally thousands of engineers in all parts of the country. The majority of these feel indebted for much of their present success to the guidance of Professor Adams during their formative years at Harvard.

He was called to the faculty of Harvard university in 1891 and took his electrical engineering degree there in 1905. He was dean of the Harvard engineering school during 1919 and received a doctor's degree in engineering in 1925. He has been Lawrence professor of engineering at Harvard since 1914.

When the war broke out in Europe, Professor Adams immediately devoted his attention to questions of industrial preparedness in this country. In 1917 he became chairman of the welding committee of the Emergency Fleet corporation and it was here that his real interest in welding as an independent art began and was developed. A year later he was responsible for the movement which resulted in the organization of the American Welding society. He became its first president and ever since has been director of the society's research activities. He has been president of the American Institute of Electrical Engineers, chairman of the John Fritz Medal board, chairman of the Edison Medal board, chairman of the general engineering committee of the Council of National Defense, chairman of the engineering division of the National Research council, and chairman of the American Engineering Standards committee.

He is a man of wide interests and many enthusiasms. One of his hobbies is traveling. This interest has taken him to Alaska and to nearly all parts of the United States and many times to Europe. In spite of an unusually full business program, he has never lost sight of the importance of outdoor life and exercise. One of his chief diversions is hiking and mountain climbing. Golf also claims a good share of his leisure time. He lives in Belmont, Mass., but spends most of his summers with his family on Marthas Vineyard island.

Many important industrial companies have retained Professor Adams as consulting engineer. He is author of "Dynamo Design" and of numerous engineering articles.

Men of the Industry

NEIL CURRIE JR., managing engineer of the motor department of the Pittsfield, Mass., works of the General Electric Co., Schenectady, N. Y., for five years, has been named Philadelphia manager. He is a graduate of the University of Minnesota and entered the employ of the General Electric Co. in 1908 through its purchase of the power apparatus department of the Western Electric Co.

Robert V. Good, section superintendent at the Schenectady works since Jan. 1, 1928, has been named assistant manager at Philadelphia. He is a native of Germany, but now is an American citizen and entered the employ of the General Electric Co. in 1913.

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H. E. Hund was elected vice president and director of the Briggs Mfg. Co., Detroit, to succeed H. C. Maise.

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J. J. Mellon, formerly of Pittsburgh, now is identified with the home office of the Clark Controller Co., Cleveland, as sales engineer.

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John Dallerup and Rex Hamicar, of Houston, Tex., recently were elected vice presidents of the Reed Roller Bit Co., Houston.

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Hon. Harry Cockshutt, president of the Cockshutt Plow Co., Brantford, Ont., has been elected chancellor of the University of Western Ontario, at London, Ont.

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Leon Walerych, formerly assistant foreman of the McCord Radiator & Mfg. Co., Detroit, has been appointed foreman of the tool division to succeed E. R. Hansen, resigned.

* * *

Harry D. Nee and Crain Jordan have been added to the engineering staff of the Ferro Enamel Supply Co., Cleveland. Both formerly were with Cleveland contracting firms.

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A. J. Hulse, assistant chief engineer of H. A. Brassert & Co., 310 South Michigan avenue, Chicago, consulting engineers, sailed last week for England on a business trip in the interests of his company.

* * *

M. W. Elmendorf, who recently resigned from the Pfaudler Co., Rochester, N. Y., has become identified with the engineering division of the Rochester plant of the Taylor Instrument Co.

* * *

Nathan Hayward has been elected a director of the Philadelphia & Reading Coal & Iron Corp., Philadelphia, succeeding Newton H. Fairbanks, resigned. Other directors were reelected.

* * *

L. C. Anderson, manager of the Portland Iron Works, Portland, Oreg., was elected president of the Pacific Northwest United Metal Trades association, at its recent annual meeting held in that city.

* * *

W. L. McGrath, vice president of the Eclipse Machine Co., New York, has been elected vice president of the Bendix Aviation Corp., that city.

W. L. Buettner, vice president of the Bendix Brake Co., has been elected to the board of directors.

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J. G. Parsons, recently elected president of the Wahl Co., 1800 Roscoe street, Chicago, also has been named a member of the board of directors of that company to succeed Secretary of Commerce Robert P. Lamont, who resigned recently.

* * *

Harry D. Fenske, formerly assistant director of the traffic, transportation and foreign trade department of the Detroit board of commerce, resigned recently to become manager of the transportation and export departments of the Great Lakes Steel Corp., Detroit.

* * *

P. P. Barrett, recently appointed sales representative in Indiana with headquarters in the Illinois building, Indianapolis, for the Apollo Steel Co., Apollo, Pa., also represents the Wykoff Drawn Steel Co. and the Fretz-Moon Tube Co. of Pittsburgh, in the same territory.

* * *

E. C. Godfrey, for nine years connected with the Pratt & Whitney Co., Hartford, Conn., in a sales capacity, has been appointed district sales manager of the Michigan territory for the Cuyahoga Steel & Wire Co., Cleveland. His headquarters are at 429 Fisher building, Detroit.

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H. L. Wanderman has organized a business for the sale of iron and steel, specializing in tubular products, with headquarters at 1440 Broadway, New York. Mr. Wanderman has resigned as vice president of E. D. Giberson & Co., with which company he had been identified for 13 years.

* * *

John J. O'Brien, Chicago, head of the Byllesby interests, which control the Philadelphia Co., holding company for various public utilities, has been elected president of the Philadelphia Co., to succeed A. W. Robertson, who resigned recently to become chairman of the Westinghouse Electric & Mfg. Co.

* * *

George W. Sprague, production manager of the National Acme Co., Cleveland, has been appointed assistant planning supervisor of the Wright Aeronautical Corp., Paterson, N. J. He formerly was active as planning control chief for the White Motor Co., Cleveland, where he had lived for 35 years.

* * *

Karl C. Schmidt, former consulting engineer for the Minnesota state board of control, and president of the Pillsbury Engineering Co., Minneapolis, has joined the engineering staff of the Freeman Boiler & Engineering Co., 222 West Adams street, Chicago. Mr. Schmidt also had been connected with the Dakota Engineering Co., Valley City, N. D.

* * *

H. P. Davis, vice president in charge of manufacturing operations for the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been placed in charge of radio operations.

J. S. Tritle, formerly general manager of the merchandising department of the Westinghouse company, with headquarters at Mansfield, O., will be in charge of manufacturing operations.

* * *

Edmund Cooper Mayo, president of Gorham Inc., New York, a new holding company to control three of the oldest jewelry concerns in the country, was formerly identified with the railroad equipment industry. He was graduated from the University of Maryland in 1904, becoming a machinist's helper with the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., next becoming associated with the American Locomotive Co., at Richmond, Va., and then

with the Cameron-Tennant Machine Works, which he purchased and renamed the Mayo Iron Works Inc. Later he became vice president of the Viaduct Electrical Co., and one year after joining the American Tube & Stamping Co. he was elected president.

* * *

Edward E. Edwards has resigned as president of the Edwards Mfg. Co., Dallas, Tex., and Cincinnati, sheet metal fabricator, manufacturer of ventilators, skylights, etc., to become president of the Fifth-Third Union Trust Co., Cincinnati. He also is president of the Paragon Refining Co., Toledo, O. Mr. Edwards has been succeeded by Howard W. Edwards, his brother in the presidency of the Edwards Mfg. Co., of which he formerly was vice president.

* * *

J. H. Hillman Jr. has been elected a director of the Standard Steel Propeller Co., Pittsburgh.

* * *

E. C. Brickman, of the production department, has been appointed employment manager of the Globe Machine & Stamping Co., Cleveland, to succeed Carl Brunn, resigned.

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George E. Johnson was recently placed in charge of a branch office of the Saginaw Stamping & Tool Co., Saginaw, Mich., established in the Transportation building, Chicago.

* * *

R. E. DeTurk, for 11 years identified with the Ohio Steel Foundry Co., Lima and Springfield, O., has been appointed sales manager of the Sawbrook Steel Castings Co., Lockland, Cincinnati.

* * *

Warren D. Oakes has been elected president of the Oakes, Swenson Co., Indianapolis. Other officers are: Vice presidents, James L. Gavin and Erie Swenson; secretary, Carl G. Swenson, and treasurer, Parry Oakes.

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A. A. Osswald, formerly with the Cleveland Punch & Shear Works, Cleveland, was recently appointed direct factory representative in Ohio territory for the V. & O. Press Co., Hudson, N. Y. His headquarters are at 710 Hippodrome building, Cleveland.

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R. S. Arthur has been appointed midwestern branch manager for the Aeroil Burner Co., West New York, N. J. His headquarters are at 176 North Wacker drive, Chicago. He formerly was in charge of the Chicago office of the Dravo Equipment Co.

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H. H. Bevan, formerly district sales manager at Kansas City, Mo., for the Buffalo Bolt Co., Buffalo, has been appointed manager of sales of the Tulsa Rolling Mills Co., Tulsa, Okla. For many years Mr. Bevan was assistant manager of sales of the Sheffield Steel Corp.

* * *

J. J. Neudoerfer, who has been general manager of sales in the pipe division of the Wheeling Steel Corp., Wheeling, W. Va., has been appointed general manager of sales. He succeeds John O. Tucker, who recently resigned to enter business for himself in Wheeling.

* * *

E. P. Thomas, vice president, United States Steel Corp., has been elected a director of the Merchants Association of New York.

Thomas J. Watson, president, International Business Machines Corp., also has been elected a director of the association.

* * *

L. A. Rowland, for 10 years superintendent of the plow works of John Deere & Co., Moline, Ill., has been made works manager of the John Deere Tractor Co., Waterloo, Iowa. His assistant, Frank M. Humason, succeeds him as superintendent at the plow works and L. A. Murphy becomes assistant superintendent.

* * *

Garrett Connors has been appointed general purchasing agent for the Truscon Steel Co., Youngstown, O. He formerly was safety director, and also has held the posts of employment manager and general efficiency engineer for the Truscon industries. He has long been closely identified with the purchasing office, and has continued to maintain sales contracts with large institutions.

* * *

Arthur P. Skaer has resigned as Buffalo district manager for the Kalman Steel Co., Chicago, and has become a partner in Crooker & Carpenter, Buffalo, general contractors. The name will be changed to Crooker, Carpenter & Skaer, offices being continued in the Crosby building.

Nelson Stone, who has been district manager for the Kalman company at Syracuse, N. Y., succeeds Mr. Skaer in the Buffalo office.

* * *

R. L. Cathcart, for three years vice president of the E. E. Zimmerman Co., Pittsburgh, prior to which time he was for eight years district sales manager at Pittsburgh for the New Jersey Zinc Co., has established his own headquarters at 2247 Oliver building, Pittsburgh, to serve as exclusive agent on tin in that district for Metal Traders Inc., New York. He also will conduct a brokerage business in slab zinc, lead, antimony, cadmium and other metals.

* * *

Joseph W. Donner, formerly general superintendent of Donner Steel Co. Inc., Buffalo, has been elected vice president in charge of operations.

Arthur G. Greenamyer, formerly assistant general superintendent, has been made general superintendent to succeed Mr. Donner, and David G. Baxter is now assistant general superintendent. Mr. Baxter has been open-hearth superintendent for Pittsburgh Crucible Steel Co. at Midland, Pa.

* * *

D. R. Smith, who has been in charge of the sale of by-products from the Twin City plant of the Ford Motor Co., St. Paul, has been placed in charge of an office established at Minneapolis by Hickman, Williams & Co. The company has taken over the exclusive sale of the coal of the Pond Creek and Banner Fork mines of the Ford company at Stone and Kentenia, Ky., having an output of approximately 800 tons daily. The Hickman, Williams company will handle the sale of all coal going to the Ford company's dock at Duluth.

Barrel Output Is Higher in April

Washington, May 21.—April production of steel barrels, as reported by 27 companies operating 31 plants to the department of commerce, was 771,584 barrels or 64.8 per cent of capacity, compared with 61.0 per cent in March and 57.5 per cent in April, 1928. Department of commerce comparison follows:

	Pro-	Ship-	Unfilled orders for delivery within	beyond
Apr.	667,827	661,949	357,131	919,863
Tot., 4 mo.	2,299,532	2,294,991	.....	.....
May	696,281	694,843	324,549	932,568
June	712,779	717,496	319,443	840,313
July	647,844	645,881	341,346	891,066
Aug.	677,313	675,600	319,495	744,863
Sept.	593,255	595,640	292,686	704,134
Oct.	656,021	661,009	301,782	522,090
Nov.	563,647	568,353	322,135	634,982
Dec.	551,113	549,913	246,460	1,110,983
Total (year)	7,397,784	7,403,726	.....	.....
1929				
Jan.	558,492	548,581	319,704	1,342,006
Feb.	567,398	563,532	345,365	1,198,481
Mar.	742,165	743,407	393,941	1,076,317
April	771,584	775,481	333,614	935,430
Tot., 4 mo.	2,639,639	2,631,001	.....	.....

Convention Is Canceled

The American Refractories institute cancelled its annual meeting which was scheduled to be held May 21 and 22 at French Lick, Ind. A date has not been set for the meeting, but this is expected to be done within the next few weeks.

British Pig Iron Is Stronger

Material Continues Scarce and More Producers Withdraw from Market—Finished Steel Demand Irregular—Belgian Markets Again Firming Up—German Mills Exporting Larger Tonnages of Semifinished Products

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, May 21.—(*By Cable*)—The general election and Whitsuntide holidays are exerting a quieting influence on the British iron and steel markets. Pig iron prices are tending upward, and Middlesbrough iron continues scarce. Producers are sold into the third quarter and are withdrawing from the market. Continental merchant bar prices are lower than the British, but little business is being transacted. Domestic demand for finished steel is irregular. The market for tin plate is quieter, owing to uncertainty in prices of tin. Galvanized sheets are firm, but few sales are noted.

A report from Paris states the domestic markets are firm. Export orders are smaller. An important order for steel sleepers for delivery to South America has been booked by a French firm. Merchant steel prices in Belgium are firm. Exports of semifinished steel from Germany are active, but the domestic market is quiet, plate and pipe mills complaining of a lack of orders.

Continental Steel Not Competing in Britain

LONDON May 10.—(*European Staff Service*)—Continental competition in the British semi-finished steel market has slackened considerably in the past month. Not only are prices of continental material scarcely competitive but the quantities offered are limited. Continental 2-inch billets are now quoted for export at about £5 8s ($26.10) f.o.b. Antwerp. They can be delivered at Birmingham for £6 2s 6d ($29.65), as against the average British domestic price of £6 10s ($31.50). However, continental deliveries are greatly extended and render this class of business unattractive to British purchasers, except in certain cases. British exports of pig iron are increasing. Middlesbrough foundry pig iron 2.5 to 3 per cent silicon is now £3 8s 6d ($16.60) f.o.b. port of shipment. The continental price for pig iron of a similar grade ranges from £3 7s 6d to £3 12s ($16.35 to $17.40) according to destination. The domestic price in France and Belgium is higher than the export price, thus British pig iron now is at a competitive level. British makers of finished steel are receiving substantial inquiries from foreign markets and some business has materialized, particularly from India, Japan and China. An order has been received from the Argentine for 9000 tons of rails, and railroad rolling stock contracts continue to be received from the colonies by British works.

From France it is reported that although production costs tend to increase makers are cautious in advancing prices for fear of stimulating British competition. In far eastern markets the French makers of sheets find difficulty in meeting British prices. In Belgium quiet conditions are prevailing in export markets. Prices, however, are firm and merchant bars are not obtainable under £6 ($29.05) per ton, while beams

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 20	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3, Silicon 2.50-3.00	$16.98	3 10 0*	$17.46	3 12 0	$17.46	3 12 0	$16.98	3 10 0
Basic	16.13	3 6 6	16.73	3 9 0	16.73	3 9 0	15.76	3 5 0
Basic-bessemer	17.58	3 12 6†	16.73	3 9 0	16.73	3 9 0	15.76	3 5 0
Hematite, Phosphorus 0.02-0.05	17.95	3 14 0	23.66	605*	.....	.....	17.46	3 12 0
SEMIFINISHED STEEL								
Billets	$31.53	6 10 0	$26.19	5 8 0	$26.19	5 8 0	$25.95	5 7 0
Wire rods	41.83	8 12 6	30.92	6 7 6	30.92	6 7 6	30.92	6 7 6
FINISHED STEEL								
Standard rails	$37.59	7 15 0	$31.53	6 10 0	$31.53	6 10 0	$31.53	6 10 0
Merchant bars	1.79c	8 5 0	1.31c	5 19 0	1.31c	5 19 0	1.32c	6 0 0
Structural shapes	1.60c	7 7 6	1.12c	5 2 0	1.12c	5 2 0	1.12c	5 2 0
Plates, ship, bridge and tank	1.76c	8 2 6	1.39c	6 6 0	1.39c	6 6 0	1.39c	6 6 0
Sheets, black, 24 gage	2.17c	10 0 0	2.26c	10 5 0	2.26c	10 5 0	2.50c	11 7 0
Sheets, galvanized, 24 gage, corrugated	2.96c	13 12 6	3.01c	13 13 9	3.01c	13 13 9	3.43c	15 12 0
Bands and strips	2.17c	10 0 0	1.40c	6 7 6	1.40c	6 7 6	1.40c	6 7 6
Plain wire, base	2.06c	9 10 0	1.71c	7 15 0	1.71c	7 15 0	1.74c	7 18 0
Galvanized wire, base	2.93c	13 10 0	2.12c	9 12 6	2.12c	9 12 6	2.11c	9 12 0
Wire nails, base	2.39c	11 0 0	1.79c	8 2 6	1.79c	8 2 6	1.76c	8 0 0
Tin plate, base box 108 pounds	$ 4.49	0 18 6	.....	.....	.....	.....	$ 6.79	1 8 0

*Francs

Domestic Prices at Works or Furnace—Last Reported			Francs		Francs		Marks	
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$16.61	3 8 6	$18.57	475(2)	$17.24	620	$18.55	78
Basic pig iron	16.13	3 6 6	19.94	510(1)	17.10	615	20.93	88
Furnace coke	3.64	0 15 0	6.06	155	5.84	210	5.11	21.50
Billets	31.53	6 10 0	24.24	620	26.27	945	28.77	121
Standard rails	1.79c	8 5 0	1.46c	810	1.63c	1,250	1.51c	140
Merchant bars	1.84c	8 10 0	1.36c	755	1.39c	1,070	1.52c	141
Shapes	1.71c	7 17 6	1.26c	700	1.22c	940	1.49c	138
Plates, ship, bridge and tank	1.87c	8 12 6‡	1.54c	855	1.46c	1,120	1.71c	158
Sheets, black, 24-gage	2.28c	10 10 0	2.92c	1,620	2.70c	2,080	2.43c	225
Sheets, galvanized 24 gage, corrugated	2.93c	13 10 0	3.78c	2,100	3.84c	2,950	3.78c	350
Plain wire	2.06c	9 10 0	1.94c	1,075	2.08c	1,600	2.48c	230
Bands and Strips	2.17c	10 0 0	1.51c	840	1.70c	1,310	1.77c	164

*Middlesbrough; †Scotch foundry iron; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 15s 0d ($3.64) f. o. b. Ferromanganese £21 13s, 0d ($105.00) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($72.75) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

are a firm market, especially for British sizes, which are quoted at £5 6s ($25.55) base. The shortage of semifinished steel continues and demand from overseas cannot be met. This is confirmed from German sources, from which it is reported that Welsh tin plate makers have been active buyers of tin plate bars at about £5 9s ($25.40) owing to retirement from the market of Luxemburg and French makers. For cold rolled hoops £10 12s 6d ($52.25) has been freely paid. While the syndicate minimum price for wire rod is £6 5s ($30.25), no business is effected under £6 7s 6d ($30.90). Quotations for wire products have fallen off. Bright wire now is £7 12s 6d ($37), galvanized wire £9 10s ($46) and wire nails £8 ($38.75). Foreign orders for locomotives have been obtained in Germany lately.

German Steelmakers in Fair Position

Berlin, May 10.—(*European Staff Service*)—The German steelworks association in its monthly report states that during April the semifinished steel department maintained its activity. There was a good domestic demand for structural steel but sales were less than in April, 1928. There was little change in the volume of export business. Domestic orders for railroad track material increased in volume. The home trade for merchant bars improved, but export business was calm and prices receded. The hoop and band market was active at home but exports were limited. In the plate department domestic business was dull but foreign orders came in satisfactorily. The tube union reports that home sales during April were unsatisfactory, while export trade was fairly well maintained.

The annual report of Demag, the large firm of machine makers and engineers of Duisburg, states that the deterioration of economic conditions during 1928 brought about a reduction in the volume of orders received, although monthly turnovers were satisfactory. The increased volume of export business compensated the reduction of domestic trade. The gross profit for 1928 was 12,565,738 marks ($2,975,000), against 12,305,392 marks ($2,925,000) in 1927. After providing for overhead expenses, taxation, welfare charges and amortization, the net profit was 2,022,732 marks ($480,000) compared with 2,002,970 marks ($474,000) in 1927. The dividend was maintained at 5 per cent.

The Mannesmann tube works made in 1928 a gross profit of 35,600,000 marks ($8,500,000), against 33,640,000 marks ($8,000,000) in 1927. The net profit was 13,720,000 marks ($3,260,000), compared with 15,790,000 marks ($3,750,000). The dividend was reduced from 8 to 7 per cent.

European Steel Market Fearful of Changes in American Tariff

BRUSSELS, May 10.—(*European Staff Service*)—Trading in iron and steel in Belgium is not pursuing the same satisfactory course as some weeks ago. It appears that affairs are not on the upward trend. Prices of bars are receding and for every commodity traded in at the Brussels iron and steel exchange orders are scarce. The position on the continent does not seem strong, and many countries fear the effects of the new policy that the United States wants to follow in the future. The discussions concerning the customs duties to be applied in America have opened the eyes of people all over the continent and are reacting on the steel industries.

Czecho-Slovakia, directing the movement, invites the European countries to unite and stand against the tendency of the United States. They justify their fears in explaining that the American steel plants are working at full capacity, but the time is near when the situation will be completely changed, and the American home market, having reduced its capacity of consumption, will be obliged to export to South America, eastern counties, and even Europe. That was the case with automobiles, which now are sold in great numbers in most countries of the continent and in Great Britain. Consequently, Czecho-Slovakia proposes to boycott American products to protect its metallurgical works, which form the major industry of that country. Whatever the result may be, it is true that this must have influence on the development of all the continental steel ententes.

The pig iron market is firm. There are heavy demands, and this explains the increase of 1s (24.00c) and 2s (48.00c) for phosphorus quality, the new prices being £3 7s 6d ($16.35) for delivery to England and £3 12s ($17.43) for overseas countries. Semifinished products remain scarce, and prices are as follows: 6-inch blooms, £4 18s ($23.72); 2-inch billets, £5 7s ($25.93); 3 and 4-inch billets, £5 4s ($25.21); sheet bars, from £5 7s 6d ($26.05) to £5 8s ($26.17). Bars are quoted at £5 19s ($28.81), having receded by 1s ($24.00c). It is said that German buyers have heavy tonnages to place, but they are waiting to limit these orders. Beams are sold at £5 2s ($24.73) for normal profiles and £5 4s ($25.21) for British sections. Many works have been unsuccessful in trying to get an increase of some shillings to obtain a price equivalent to those quoted for semifinished products.

The meeting of wire rod manufacturers was held in Berlin last week. It seems that a satisfactory agreement has been reached. The actual contract will be renewed until Dec. 31, 1931, but this is contingent upon the renewal of the German comptoirs. The price of wire rod has been maintained. The Germans have agreed to quote c.i.f., the freight being transacted by the central organization in Dusseldorf, and this process will oblige members of the international wire rod sales organization to fix the same price for a certain destination.

Belgian Output Up

Brussels, May 10.—(*European Staff Service*)—Output of pig iron in Belgium during March exceeded that of February. Production of steel ingots and castings in March including 338,350 tons of steel ingots and 10,480 tons of steel castings. Comparative figures follow:

Mon. ave.	Coke	Act. Furn.	Pig iron	Steel ingots and castings	Finished steel
1913	294,000	....	207,055	205,550	154,920
1926	413,000	....	283,270	281,160	231,810
1927	448,880	....	312,620	309,040	255,185
1928	493,885	....	325,445	327,870	281,125
1929					
Jan.	513,550	56	350,680	357,010	313,000
Feb.	458,740	55	302,320	302,020	266,790
Mar.	520,660	56	334,000	348,830	300,340

French Tonnage Larger

Paris, May 6.—(*European Staff Service*)—Output of pig iron in France during March was much larger than in February. It included 683,000 tons of basic bessemer, 107,000 tons of phosphorus foundry, 7000 tons of semiphosphorus, 35,000 tons of hematite foundry, 29,000 tons of hematite gray forge and 19,000 tons of ferroalloys.

March output of steel ingots and castings included 785,000 tons of ingots and 18,000 tons of castings. These consisted of 553,000 tons of basic bessemer, 229,000 tons of openhearth, 6500 of acid bessemer, 1500 crucible and 13,000 tons of electric steel.

The following table shows production:

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	131	433,940	390,580
1926	155	785,965	702,500
1927	142	774,785	689,610
1928	153	841,415	782,995
1929			
Jan.	157	905,000	838,000
Feb.	157	781,000	742,000
March	156	880,000	803,000

Luxemburg Output Gains

Brussels, May. 6.—(*European Staff Service*)—Output of pig iron in Luxemburg during March was well above that of February and included 231,839 tons of basic bessemer, 4475 tons of foundry and 725 tons of gray forge pig iron.

The output of steel ingots and castings in March also exceeded that of February and included 217,156 tons of basic bessemer, 2901 tons of openhearth and 1313 tons of electric steel.

The following table shows production figures:

Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings
1913	....	212,320	111,355
1926	40	209,295	186,980
1927	39	227,710	200,595
1928	38	230,840	214,315
1929			
Jan.	38	241,639	224,617
Feb.	38	209,207	195,338
March	38	237,039	221,370

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

MORGAN ENGINEERING CO., Alliance, O., has re-elected officers, as follows: President, A. F. Morris; secretary and controller, Charles H. Birr; treasurer, T. D. Russell. Directors consist of these officers, A. V. Cannon, W. H. Morgan, W. H. Ramsey and R. A. Cannon.

* * *

INDUSTRIAL BROWNHOIST CORP., Cleveland, has moved its Pittsburgh offices from the Oliver building to 2401 Koppers building.

* * *

INDEX MACHINERY CORP., Cincinnati, has moved its offices to 49 Central avenue, where larger facilities are available.

* * *

MERRILL MACHINERY & SUPPLY CO., Merrill, Wis., has changed its name to Merrill Mfg. Co., and its capital has been increased from $75,000 to $100,000 to accommodate growth.

* * *

GALVANIZING PRODUCTS CORP., a new organization, is engaged in jobbing galvanizing work in Pittsburgh. E. W. Utzler is president; other officers are: Vice president and general manager, Thomas J. Hanlon; treasurer, W. O. Shellenberger.

* * *

GENERAL REFRACTORIES CO., Philadelphia, and Harbison-Walker Reractories Co., Pittsburgh, have obtained licenses from the recently organized Inland-Stuart Linings Inc. to sell the patented blast furnace lining controlled by the latter.

* * *

LINICK, GREEN & REED INC., 10 South Wabash avenue, Chicago, manufacturer of die and toolmakers' supplies and tools and scientific supplies, has succeeded the Chicago Jewelers Tool Works, the alteration in name being the only change.

* * *

TECKTONIUS MFG. CO., 1228 Racine street, Racine, Wis., manufacturer of hardware specialties, has taken over the Racine Appliance Co., also of Racine, manufacturer of barbecue equipment. The plants are being consolidated. W. S. Goodell, president of the Appliance company, is sales manager of the barbecue equipment division of the Tecktonius company.

* * *

NU-WAY FURNACE CO., Tulsa, Okla., capital $50,000, has been incorporated by G. T. Bynum, A. C. Sweeney and F. F. Shoemaker to take over the manufacture of domestic furnaces from Tulsa Stove & Foundry Co.

* * *

TIDAL REFINING CO., Houston, Tex., has acquired a 700-acre site for an oil refinery on Ship Channel adjoining property on which Shell Petroleum Corp. is now building a large refinery. C. R. Barton is vice president and general manager.

* * *

WHEATLEY BROS., Tulsa, Okla., capital $200,000, has been chartered by Thomas Wheatley and M. F. Hampton, Tulsa, and Frank Wheatley, Kansas City, Mo., to take over the manufacturing business of Wheatley Bros. Brass & Machine Works.

* * *

COLE MFG. CO., Chicago, has bought from the Ferro Enamel Supply Co., Cleveland, a continuous type porcelain enameling furnace. The Wehrle Co., Newark, O., has ordered from the same builder a second continuous furnace, to be combination oil and gas fired.

* * *

THEW SHOVEL CO. and Universal Crane Co. have moved their New York offices to 2513 Chanin building and their Chicago offices to room 2046 Builders building, 228 North LaSalle street. Each of these offices will operate as a joint sales office, but with separate organizations.

* * *

BUSSMAN MFG. CO., St. Louis, manufacturer of electric fuses and portable lamps, has been merged with McGraw Electric Co., Chicago. No change in management is contemplated, according to announcement, and the St. Louis plant will be operated as a division of the McGraw Electric Co.

* * *

BENJAMIN HARRIS & CO., Chicago, smelters and refiners of secondary metals, are occupying new offices at suite 1725, 333 North Michigan avenue. The firm's building at Twenty-first and Loomis streets, Chicago, which formerly housed the offices and warehouse, has been sold to H. Kramer & Co. In the future all smelting activities will be carried on at the company's plant at Chicago Heights.

* * *

E H. BOLLENBACHER, formerly identified with McClennan & Junkersfield Inc., New York, engineers, has established an office in Atlanta, Ga., and will act as representative of several well known manufacturers, including Ajax Electric Hammer Corp., New York; Automatic Temperature Control Co., Philadelphia; Sundh Electric Co. Inc., Newark, N. J., and Liquidometer Co. Inc., Long Island City, N. Y.

* * *

WILSON-SNYDER MFG. CO., Braddock, Pa., manufacturer of pumps, recently acquired by Oil Well Supply Co., Pittsburgh, has been reorganized. The Wilson-Snyder Mfg. Corp. has been formed under the laws of Pennsylvania to take over the property, with $600,000 capital, and will operate as a separate unit from Oil Well Supply Co. Initial expenditures at the Braddock plant will include a machine shop to cost about $60,000.

* * *

ATLAS BOAT CORP. has been organized at Menominee, Mich., by E. P. Smith. The former canning factory of the Michigan Refining and Preserving Co. has been bought and will be equipped for production of steel and wooden boats. W. O. Welch, formerly designer and builder for the Century Boat Co., Milwaukee, and L. L. White, assistant manager for the same company, have joined the new organization. Christian Sommers will be general superintendent.

* * *

AJAX AUTO PARTS CO., Racine, Wis., and Walker Mfg. Co., also of Racine, have been merged and the business will be continued under the name of the latter. Both companies manufacture automobile jacks. Willard T. Walker is president and treasurer, Warren H. Walker vice president and M. H. Lundberg secretary, of the Walker company. John W. Bate, owner of the Ajax company, will

become a director of the Walker company.

* * *

GREENFIELD LAWN MOWER CO., Greenfield, Ind., F. J. Murray and R. E. Collins, owners, has taken over the Abbott Foundry & Machine Shop, Greenfield, Ind., for the manufacture of lawn mowers.

* * *

MINNESOTA RADIATOR CORP., Duluth, has been incorporated to take over the Duluth plant and business of the Minnesota Radiator Co. It will manufacture cast iron radiators for heating purposes. Harry C. Strong Jr. is secretary and manager.

* * *

J. D. WALLACE & CO., Chicago, manufacturer of portable woodworking machinery, has taken over the John T. Towsley Mfg. Co., Cincinnati, manufacturer of large woodworking machinery and factory trucks. The latter will operate under its own name as a division of the Wallace company.

* * *

CENTRAL ALLOY STEEL CORP., Massillon, O., has moved its New York district offices from the Pershing Square building to the New York Central building, 230 Park avenue, New York. A. W. Minuse is district sales manager in the New York district.

The company has moved its Detroit office to the Fisher building, West Grand boulevard and Second street.

* * *

MINNEAPOLIS-MOLINE POWER IMPLEMENT CO., organized with a Delaware charter, has completed its plan of financing and will acquire the properties and business of the Minneapolis Steel & Machinery Co. and Minneapolis Threshing Machine Co., Minneapolis, and Moline Implement Co., Moline, Ill.

* * *

PRESSED STEEL CAR CO. has moved its Chicago office to 625 Peoples Gas building, 122 South Michigan boulevard.

* * *

ALA MFG. CO., 401 South Sangamon street, Chicago, has changed its name to Hydrometer Corp. of America. No change in policies or personnel are being made.

* * *

NATIONAL TWIST DRILL & TOOL CO., Detroit, manufacturer of twist drills, milling cutters, reamers and similar tools, has acquired a substantial interest in the Winter Bros. Co., Wrentham, Mass., manufacturer of taps and dies. No changes will be made in the Winter organization and John, Murray and Charles Winter will remain in the same executive capacities as before.

Iron and Steel Imports Light in 1928

Iron and steel imports into the United States in 1928, exclusive of iron ore, as reported by the department of commerce, totaled 782,672 tons. Distribution of this tonnage according to countries of origin and principal forms is given in the accompanying table. In addition to countries shown in the tabulation, Belgium, New Zealand and British Malaya exported one ton each to the United States, Hong Kong two tons, Virgin islands three tons, and Honduras two tons. The grand totals do not agree exactly with items from some countries, as minor tonnages have been omitted to conserve space.

The total for the year compares with 750,467 tons in 1927, 1,111,090 tons in 1926 and 943,240 tons in 1925.

Iron ore imports totaled 2,452,646 tons and manganese ore, measured by manganese content, 208,871 tons. Chile sent most of the iron ore, 1,434,860 tons, while Algeria and Tunisia sent 445,860 tons, Cuba 369,286 tons, Sweden 28,080 tons, Brazil 31,805 tons, Newfoundland 37,048 tons, Spain 37,420 and Sweden 26,558 tons. Of the manganiferous ore Soviet Russia contributed 79,529 tons, Brazil 64,290 tons and British India 42,058 tons.

As shown in the table, Belgium sent the largest tonnage, with 191,818 tons, Germany second in tonnage, France third and the United Kingdom fourth. Only these exported more than 100,000 tons to the United States during the year.

The largest tonnage was made up of structural shapes, 163,761 tons, of which 161,390 tons were plain shapes. Pig iron was second largest with 140,644 tons. Principal sources of this were the Netherlands with 26,989 tons, United Kingdom with 50,945 tons and British India with 56,420 tons. The latter was delivered principally on the Pacific coast. Scrap imports totaled 63,314 tons, of which 49,974 tons came from Canada.

In the accompanying table pig iron includes ferroalloy totals and steel and iron classifications have been combined in some instances.

Imports of Iron and Steel Products for 1928

(In Gross Tons)

From	Pig Iron	Scrap	Ingots	Bars	Hoops, Bands	Plates	Sheets, Skelp	Tin Plate	Shapes	Rails and Fastenings	Pipe	Wire	Nails	Bolts, Nuts	Castings and Forgings	GRAND TOTAL
Austria	....	....	75	277	....	....	10	....	....	....	....	5	7	....	10	384
Belgium	261	6	10,923	41,908	13,748	2,277	6,250	7	92,478	2,119	12,298	974	1,355	89	589	191,818
Czechoslovakia	....	....	26	266	17	....	....	....	167	....	2,121	240	47	....	8	2,897
France	465	216	7,229	15,776	7,103	3,925	146	....	36,102	1,048	51,212	245	981	4	42	124,722
Germany	749	1,053	660	15,628	19,211	1,795	15,947	94	32,079	4,549	25,586	5,957	7,346	86	1,825	135,012
Hungary	....	....	....	....	141	....	....	....	....	....	....	....	....	....	....	141
Italy	580	385	....	2	....	....	....	....	....	....	3	....	....	....	....	970
Netherlands	26,989	....	12	187	1,952	9	54	....	1,249	....	627	1,522	238	40	2	33,055
Norway	13,603	6	5	56	4	....	....	....	....	....	13	34	5	....	1	13,727
Poland and Danzig	....	....	....	....	....	....	....	....	....	2,482	1,249	....	....	....	....	3,731
Spain	....	....	....	....	....	....	....	....	....	....	1	....	10	....	....	11
Sweden	3,342	840	2,226	12,435	335	1	112	....	47	....	1,120	1,639	21	....	43	29,309
Switzerland	73	....	....	....	1	....	....	....	....	....	....	4	3	....	....	81
United Kingdom	66,571	8,190	238	1,127	9,190	18	247	778	1,526	182	6,890	4,840	51	16	333	100,952
Canada	23,501	49,974	46	130	58	....	6	43	101	4,795	4,768	45	68	43	279	85,862
Panama	....	381	....	....	....	....	....	....	....	....	....	....	....	....	....	381
Mexico	423	93	....	....	....	....	2	....	....	....	33	....	1	....	....	552
Jamaica	....	628	....	....	....	....	....	....	....	....	....	....	....	....	....	628
Other British West Indies	....	100	....	....	....	....	....	....	....	....	....	....	....	....	....	100
Cuba	....	....	....	....	....	....	....	....	12	....	....	....	3	....	....	15
Dom. Republic	....	438	....	....	....	....	....	....	....	....	368	....	....	....	....	806
Ecuador	....	700	....	....	....	....	....	....	....	....	....	....	....	....	....	700
British India	56,420	300	....	....	....	....	....	....	....	....	....	....	....	....	....	56,720
China	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	7
Japan	....	....	....	....	25	....	....	....	....	....	....	15	....	....	41	81

Obituaries

CALVIN W. VAUGHN, 70, president of the Vaughn Machinery Co., Cuyahoga Falls, O., died following a heart attack, May 10, in that city. He was born July 11, 1858, in Cuyahoga Falls and while attending high school there he began to work part time in the machine shop of Turner, Parks & Co., predecessor of the company of which he later became head. He became a machinist's apprentice, following in his father's footsteps, and when the latter died he inherited his interest in Turner, Vaughn & Taylor Co. Calvin Vaughn purchased the interests of others and was elected vice president in 1892, become president in 1895. The name of the corporation recently was changed to the Vaughn Machinery Co.

* * *

H. Glenn Ireland, 44, president of the Birmingham Slag Co., Birmingham, Ala., died at New York, May 18.

* * *

Gen. George S. Field, 83, nationally known consultant in bridge construction, died May 18.

* * *

John Drew, 80, well known in the manufacture of engines and boilers and in shipbuilding, died May 16 at his home in Newburgh, N. Y.

* * *

Robert Barr, 80, for several years superintendent of the Grimes Machine Shops, Bluffton, Ind., died recently there. He had been ill since last December.

* * *

Horatio S. Bradley, 76, president of the Lagonda Tube Mfg. Co., Springfield, O., died recently at his home in that city, after a lengthy illness.

* * *

William Davies, 80, formerly connected with the rolling department of the Duquesne plant of the Carnegie Steel Co., died May 15 at Duquesne, Pa. He retired 18 years ago.

* * *

Frank P. Boyd, 57, general manager of the Protane Gas Corp., and former purchasing agent of the Erie Forge & Steel Co., Erie, Pa., died at his home in that city following a long illness.

* * *

Albert E. Pyott, 60, president and treasurer of the Pyott Foundry Co., Chicago, died at his home in that city, May 10. He was a member of the Chicago Athletic association and the Edgewater Golf club.

* * *

Allan E. Johnson, 55, special engineer for the A. O. Smith Corp., Milwaukee, died May 4 at his home in that city. He formerly was identified with the Brown Hoisting Machinery Co., Cleveland; the Dominion Bridge Co., Montreal, and the Whiting Corp., Harvey, Ill.

* * *

A. W. Munster, 75, widely known bridge engineer, died at Seattle May 13. For many years he was city bridge engineer for St. Paul and from 1904 to 1907 was chief engineer of the Chicago Great Western railroad. For 20 years he had lived in Seattle.

* * *

F. H. Cohoe, 55, for 12 years general superintendent of the Mesabi and Cuyuna ranges of the M. A. Hanna Co., Cleveland, with headquarters at Hibbing, Minn., died May 18. Mr. Cohoe had been engaged in the production of iron ore for more than 30 years. His original work was with the Oliver Iron Mining Co.

* * *

Joseph N. Lapointe, 68, head of the Lapointe Machine Tool Co., Hudson, Mass., and later of the O. N. Lapointe Co., Marlboro, Mass., died at New London, Conn., May 4. He previously had been identified with the Pratt & Whitney Co., Harford, Conn., having had charge of its experimental work for about 14 years.

* * *

Edward D. Hall, 46, assistant engineer of manufacture at the Western Electric Co.'s Hawthorne works, Chicago, died May 17. He was regarded as an expert in the science of communication. After several years in the field and as an executive in telephone laboratories in New York, Mr. Hall went to the Western Electric Co. plant in Chicago.

* * *

Vantyle Coddington, 77, founder of the Lakeside Bridge & Steel Co., Milwaukee, and chairman of its board of directors, died May 17 after a brief illness. He was graduated from the University of Illinois in 1875 and in 1901 became associated with the Wisconsin Bridge & Iron Co. He resigned in 1913 to organize the Lakeside company with his son, Samuel C. Coddington, now president.

* * *

Arnold L. Empey, secretary and treasurer of the Foster Bolt & Nut Mfg. Co., Cleveland, died May 14. He was born in Belleville, Ont., was graduated from Cornell university. For a time he practised law in Rochester, N. Y., but before locating in Cleveland to enter the nut and bolt business with his uncle, A. M. Foster, he was in the bond business in Buffalo.

* * *

R. E. Bissell, 37, chief engineer of Thompson Products Inc., Cleveland, died May 15, following the explosion and fire at Cleveland Clinic. He was born at Milford, Mich., Sept. 4, 1892. He attended Michigan State college, obtaining a bachelor of science degree in 1913 and the following year he was granted a master of science degree at the University of Michigan. In 1927 Michigan State college awarded him an honorary degree of master of engineering in recognition of his contributions to automotive progress. During the World war, he performed important duties at the plant of Dodge Bros., Detroit, and at the Detroit Steel Products Co. Ten years ago he became identified with the Thompson Products Co. Inc., and last year was appointed chief engineer. He also directed the activities of that interest's subsidiary, Thompson Research Inc.

Long Cars for Shapes

Pittsburgh, May 21.—Pittsburgh & Lake Erie railroad has received from car builders 100 gondola cars, 65 feet in length and of 70-ton capacity. These cars, built in New York Central car shops, are specially adapted to transportation of steel structural shapes and fabricated steel material for bridges and buildings. Formerly such material often had been too long to be loaded in an ordinary 46-foot gondola car, making it necessary for shippers to resort to the use of two cars at additional expense for material and labor.

Decatur Castings Co., Decatur, Ind., is now employing 150 men, the greatest number in its history.

CONSTRUCTION and ENTERPRISE

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East Central

CHICAGO—Empire Metal Products Co., 5443 West Roosevelt road, has awarded masonry and carpentry contract for 1-story plant, 120 x 180 feet, to Seymour Construction Co., 1540 East Fifty-third street, Chicago. (Noted April 18.)

CHICAGO—Unit Corp. of America, Fifty-third avenue and Burnham street, W. H. Schmidt president, has plans for machine shop addition. Estimated cost about $75,000; reported owner will take bids about August.

CHICAGO—Francis & Nygren Foundry Co., 2542 Fillmore street, W. Francis president, has awarded contract for plant addition, to Strobel & Hall, 192 North Clark street, Chicago, Estimated cost $60,000.

EAST ST. LOUIS, ILL.—Ramapo-Ajax Corp., Main street and Bond avenue, manufacturer of switches, frogs, and general railroad equipment, has started construction on plant addition, 25 x 80 feet.

GLENVIEW, ILL.—Curtiss Flying Service has started construction on three hangars at its new airport here. Repair shops also are being built. Estimated cost of hangars $225,000. (Noted May 2.)

ANDERSON, IND.—Central Indiana Gas Co., 748 Main street, has plans for new producing plant at Pearl street and Belt railroad. J. A. Moxon, Muncie, Ind., is district superintendent.

INDIANAPOLIS—City hospital plans to construct a power plant at 960 Locke street. R. F. Daggett, 922 Continental Bank building, is architect. Estimated cost about $516,000. (Noted Jan. 10.)

DETROIT—Board of education, Charles Gadd business manager, 1354 Broadway avenue, plans to build power house at Roosevelt school, 11526 Linwood avenue. Malcomson & Higginbotham, 1219 Griswold street, are architects.

DETROIT—Hudson Motor Car Co., 12601 East Jefferson avenue, plans to build 1-story addition, 93 x 320 feet, including crane way to its Gratiot avenue plant. Plans are by A. Kahn, 1000 Marquette building, Detroit.

DETROIT—Federal Screw Works, 3401 Martin street, plans construction of addition, 75 x 400 feet, to be used for airplane parts division, also plans addition, 65 x 130 feet at its Chelsea, Mich., plant.

DETROIT—United Forge & Machine Co., 2145 Franklin avenue, has plans to increase its production capacity, according to Alan C. Prince, president and general manager.

DETROIT—Detroit Insulated Wire Co., 4647 Wesson avenue, has awarded contract for plant addition to Cooper-Little Co., 5057 Woodward avenue, Detroit.

DETROIT—Detroit Gasket & Mfg. Co. has awarded the general contract for plant addition to Krieghoff Co., French road, Detroit.

DETROIT—Ternstedt Mfg. Co., 6307 West Fort street, has awarded construction contract for 2-story plant addition, 125 x 134 feet on Crawford street, to J. A. Utley, 700 Harper avenue, Detroit. Electric motors and miscellaneous shop equipment will be installed.

MUSKEGON, MICH.—American Show Case & Mfg. Co., 5235 Grand River avenue, Detroit, will spent about $210,000 for new equipment and remodeling the Superior Cabinet Co. plant here, which it recently purchased, according to Kelly Kaufman, vice president in charge of operations.

PONTIAC, MICH.—Grand Trunk railroad, 400 East Jefferson avenue, care Mr. Laird, is preparing plans for power house, machine shop, roundhouse and other buildings to be built on Oakland avenue, here.

PORT, HURON, MICH.—Pressed Metals of America Inc. has started construction on 1-story plant addition, part of expansion program. Estimated cost $100,000 with equipment.

CLEVELAND—Kalsch & Hoeffler, 4500 Euclid avenue, architects are taking bids for plant for the Cleveland Universal Jig Co., 2005 Rockwell avenue.

CLEVELAND—Great Lakes Aircraft Corp., 16800 St. Clair avenue, has awarded construction contract for plant addition to the Austin Co., 16112 Euclid avenue, Cleveland. (Noted Jan. 24.)

CLEVELAND—Curtiss Flying Service, 27 West Fifty-seventh street, New York, will start construction immediately on its recently acquired property here for airport. Repair shops will be included.

DAYTON, O.—Dayton Power & Light Co., 20 South Jefferson street, plans construction of steam heating plant at Longworth and Eaker streets. Estimated cost $300,000.

YOUNGSTOWN, O.—Youngstown Steel Car Door Co. has purchased a 15 acre site on the Erie railroad here, and contracts will soon be awarded for a new plant. Executive offices now at 380 The Arcade, Cleveland, will be transferred to Youngstown, O. Estimated cost $750,000.

WHEELING, W. VA.—Industrial Land & Building Co. has awarded contract for building a plant at Glendale, near here, to R. R. Kitchen Co., 37 Nineteenth street, Wheeling. Plant will be leased to the Judelson Dryer Co., manufacturer of laundry equipment, at present located on Long Island, N. Y.

APPLETON, WIS.—A permit has been issued to the Wisconsin-Michigan Power Co., 112 East College avenue, for building a forge and machine shop costing about $25,000, adjacent to its local plant at 817 South Oneida street.

BELOIT, WIS.—Wisconsin Power & Light Co., Madison, Wis., has let the general contract to John Schneiberg, 945 Bluff street, Beloit, for erecting a 3-story addition, 42 x 65 feet, to its local power plant. It will cost about $50,000 and was designed by Sargent & Lundy, consulting engineers, 72 West Adams street, Chicago A. P. Gale is local manager. (Noted Feb. 14.)

OOSTBURG, WIS.—Village board is having plans prepared by the Jerry Donohue Engineering Co., Sheboygan, Wis., for a municipal water supply and distribution system to cost about $30,000. Ben Hessling is village clerk.

LA CROSSE, WIS.—Isle La Plume Boat & Pattern Works is about to start work on a factory addition, 38 x 120 feet.

MILWAUKEE—American Hair Felt Co., Forty-fourth and State streets, will build an addition, 27 x 115 feet, to its private machine and service shop, the general contract having been let to John L. Stanage, 3526 Cedar street.

MILWAUKEE—Liberty Foundry Co. Inc., Sixty-sixth and State streets, has let the general contract to William F. Tubesing, 139 West Chestnut street, Wauwatosa, Wis., for erecting a

Resale News

SALE of machinery and equipment of the Butler Bolt & Rivet Co., Butler, Pa., has been set for June 6. The equipment is that used for production of bolts and nuts in complete variety.

* * *

Contractor's equipment of L. Dautel & Sons Co. Inc., 5710 Hough avenue, Cleveland, will be sold by Gus Rosen, commercial auctioneer, May 29. It consists of concrete mixers, pumps, trucks, sheet piling and similar material.

Sales Calendar

May 23—Auction of land, buildings and equipment of the Cron Co., Piqua, O.

May 29—Sale of equipment of L. Dautel & Sons Co. Inc., contractors, 5710 Hough avenue, Cleveland.

June 16—Auction of machinery and equipment of Butler Bolt & Rivet Co., Butler Pa.

machine shop, 80 x 102 feet, costing about $40,000.

MILWAUKEE—Casper F. Deising, 347 Fifth street, will remodel building, 50 x 100 feet, for occupancy by the Widmeyer Spring Co., manufacturer of vehicle springs, mainly for automobile replacement, and now at 426 Michigan street.

SHEBOYGAN, WIS.—Board of public works will be ready about Aug. 1 to call for bids for the construction of the new municipal filtration plant, estimated to cost $375,000 with a reservoir capacity of 2,000,000 gallons. Plans are being made jointly by Pearse, Greeley & Hansen, Chicago, and the Jerry Donohue Engineering Co., Sheboygan. C. U. Boley is city engineer. (Noted March 28.)

WAUKESHA, WIS.—S. A. Perkins, secretary and treasurer of the Waukesha Motor Co., is interested in a company to take over a concern manufacturing automotive parts in another Wisconsin city and re-establish it in Waukesha. Contracts have been let by Mr. Perkins for a new plant, 175 x 300 feet, with a 2-story office portion, costing about $100,000. No other details of the matter have been released by Mr. Perkins.

North Atlantic

HARTFORD, CONN.—Skayef Ball Bearing Co., 330 New Park avenue, has plans for a 1-story plant addition, 75 x 150 feet. Estimated cost $80,000.

TORRINGTON, CONN.—Hendey Machine Co. has started construction on a 1-story and basement addition, 80 x 300 feet.

EASTHAMPTON, MASS.—Williston Academy, care A. V. Galbraith, is receiving bids for constructing recreation building including power plant.

NEWTON, MASS.—Raytheon Mfg. Co., Maple street, manufacturer of radio tubes, equipment, etc., has plans for a 2-story and basement addition, at 49 Chapel street. Estimated cost $60,000 including equipment.

WORCESTER, MASS.—Worcester Wire Works Inc., 230 Ludlow street, has started construction on a 2-story plant addition, 60 x 90 feet.

FREEHOLD, N. J.—Central Novelty Cutlery Co., care J. Berger, has purchased a building and will equip it with machinery after remodeling.

NEWARK, N. J.—Natural Carbonic Gas Co., McClellan street, has awarded contract for a 1-story and basement addition to Enstice Bros., 111 Academy street, Newark. Estimated cost $40,000.

NEWARK, N. J.—Packard Motor Co., Broadway and Sixty-first street, New York, plans to erect a 3-story and basement building, 200 x 245 feet, on Central avenue between Sixteenth and Seventeenth streets. Estimated cost $300,000. A. Kahn, 1000 Marquette building, Detroit, is architect.

MECHANICVILLE, N. Y.—R. A. M. Brick Co. plans installation of power equipment in connection with proposed rebuilding of part of plant, recently damaged by fire.

NEW YORK—International Projector Corp., 90 Gold street, manufacturer of motion picture machines, has acquired a 6-story building adjacent to its plant, and will later add four stories, doubling capacity.

OSWEGO, N. Y.—John Lagoe & Son, East Twelfth and Mitchell street, has construction under way for a machine shop addition.

TONAWANDA, N. Y.—Hill-Madden Boat Corp. will construct a dry dock and repair facilities for small river and lake craft. An office building is also planned.

MIDDLETOWN, PA.—I. O. O. F. Home, 1501 West Hunting Park avenue, Philadelphia, care J. W. Loux, has awarded contract for power house here to J. W. Pomraning, 301 Market street, Harrisburg, Pa. (Noted April 25.)

NEW KENSINGTON, PA.—Aluminum Co. of America, Oliver building, Pittsburgh, plans installation of power equipment in proposed addition to plant here. (Noted March 21.)

PHILADELPHIA—Brown Instrument Co., Roberts and Wayne avenue, has awarded construction contract for plant addition, 79 x 206 feet, with wing 79 feet long in the rear, to Robert E. Lamb Co., 841 North Nineteenth street. (Noted May 2.)

PITTSBURGH—Rudd Mfg. Co., Twenty-ninth and Smallman avenue, manufacturer of gas water heaters, has begun construction of additional plant facilities. Some of the departments will be moved into the new building and the entire plant facilities will be improved.

WASHINGTON, PA.—Washington Mold Machine & Foundry Co., West Beau street, has awarded contract for constructing a foundry to Hutter Construction Co. (Noted May 9.)

West Central

CARROLL, IOWA—Saul Aircraft Corp., care W. J. Saul, is having preliminary plans prepared for construction of an airplane plant. Estimated cost $125,000.

LEE SUMMITT, MO.—City plans construction of electric light plant, to cost about $100,000. W. B. Rollins & Co., 339 Railway Exchange building, Kansas City, Mo., is engineer.

ST. LOUIS—Union Electric Light & Power Co., Twelfth and Locust streets, has awarded contract for power plant on Osage river near Bagnall, Mo., to Stone & Webster Engineering Corp., New York. (Noted May 2.)

ST. LOUIS, MO.—Independent Die & Supply Co., 2637 LaSalle street, is completing an addition, 20 x 130 feet, to its shop.

BROKEN BOW, NEBR.—City council has plans in progress for municipal power plant. Grant & Fulton, 525 South Thirteenth street, Lincoln, Nebr., are engineers. Estimated cost about $50,000.

Southern States

HUNTSVILLE, ARK.—Arkansas Electricity & Water Co., J. A. Harrington manager, has awarded contract for construction of power plant, 60 x 60 feet, to P. B. Reed, Huntsville.

JONESBORO, ARK.—City water and light plant, Lloyd Rebsamen assistant manager, plans power plant improvements.

MACON, GA.—Taylor Iron Works & Supply Co. has plans for making extensive improvements to its plant. A new structural shop and two other units will be included in the program, according to W. Andrew Taylor, president.

MONROE, LA.—International Gas Products, J. H. Mann president, has announced plans for a carbon black plant in the Richland Parish gas field.

TULSA, OKLA.—T. B. Slick interests have purchased Wrightman Petroleum Corp. oil properties in the Asher, Okla., district of Seminole area. Ultimate construction of a gasoline plant and air-lift station is planned.

TULSA, OKLA.—Metal Safety Placard Co., manufacturer and distributor of metal placards for tank cars, has moved its headquarters from Borger, Tex. to Tulsa and contemplates erection of a manufacturing plant in the near future. W. A. Taylor, Hunt building, is president.

CHATTANOOGA, TENN.—Farmer & Co., recently incorporated, is reported planning to establish a plant here to manufacture a new kind of steel plate for railroad crossings. Lovell J. Morris, Volunteer building, is said to be interested in the company.

JACKSON, TENN.—Legislature passed measure enabling city to issue $1,000,000 bonds for municipal electric and gas plants.

BIG SPRINGS, TEX.—City awarded contract for constructing two hangars and a machine shop, 40 x 60 feet, at airport to International Steel & Derrick Co., Fort Worth, Tex. Work will begin immediately.

(*Continued on Page* 1447)

Machinery

Buying Continues at Steady Rate With Some Unusual Orders—April Level May Be Equaled—Crane Activity Holds Well

ACTIVITY in crane market continues and locomotive cranes seem to be in the lead. Ten of this type have been placed recently in the New York district and a number more are on inquiry. The Chesapeake & Ohio railroad has opened bids on 36 two-ton jib cranes, the third large list for this road in recent weeks. In machine tools steady buying of small lots and single tools is giving a good total, in the absence of large lists. Railroads are active in inquiry and are doing some buying. Demand is well spread over various classes of tools, with no one variety predominating. A builder of milling machines has advanced one size 10 per cent and it is believed an advance of 10 per cent on planers is imminent. At Chicago an inquiry is out for school shop tools.

New York, May 21.—Although demand for machine tools lacks large lists, trading continues brisk. Sellers assert that orders for one or two tools each are holding up in surprising volume. It is believed by leading makers, however, that the month will not be quite up to April. A recent inquiry includes several machine tools for the New York Central railroad, among which are an axle lathe, vertical surface grinder and two or three turret lathes. Price revisions include an advance of 10 per cent in a line of shapers.

The crane market is featured by a more lively demand for locomotive cranes. Fully 10 have been recently placed in this district and a substantial number are on inquiry. Chesapeake & Ohio recently closed bids on a list of 36 two-ton handpower pillar cranes. This is the third large list for this railroad in recent weeks.

Pittsburgh, May 21.—Machine tool sales are holding well to the rate of April and little letup is noted in inquiry. Although large individual jobs are scarce, demand is well diversified and aggregates fairly large. Westinghouse Electric & Mfg. Co. has placed several additional tools. Delivery shows no improvement, with shipment of milling machines, drills and lathes extended 90 days or more in some instances. This is having some influence in prompting buyers to place tools for future requirements.

Chicago, May 21.—The month's total of machine tool sales was boosted by some large orders in this district during the past week. May orders thus far indicate that the month will close as an unusually heavy sales month. Several houses report sales likely to be the best since October, when the pick-up developed, while others believe the record sales of March, this year, probably will not be surpassed. Current orders make up for the absence of large formal inquiry lists. Active sales were reported in lathes, punch presses, multiple spindle drills, shapers, plate and structural equipment, and miscellaneous items. Used tool sales also are active, dealers' floor stocks having been greatly reduced in the past several weeks. A newly organized tool and die shop in this district purchased about $80,000 worth of new equipment. Orders were closed also for several large milling machines. Oregon-Washington Railroad & Navigation Co., subsidiary of Union Pacific, has issued a list for 15 items, but purchase likely will be made on the coast. Chicago & North Western is inquiring for a 2⅝-inch screw machine, and the St. Paul for several portable tools and lighter equipment. Chicago board of education asks quotations for technical high school tools. Demand is of such character that few tools remain long in dealer stocks. One builder of milling machines advanced quotations 10 per cent on one size of his product, effective May 15. Reports are heard that prices of planers may be advanced 10 per cent June 1 or June 15.

Places Plate Mill

Mackintosh-Hemphill Co., Pittsburgh, has been awarded contract to build plate mill at Gadsden, Ala., for Gulf States Steel Co., cost to be approximately $1,500,000. The mill will be electrically driven, roller bearing and modern in every detail. It will have a monthly capacity of 25,000 tons of plates and is to be completed about Feb. 1, 1930. All iron and steel castings and other material possible will be obtained in the Birmingham district. Gulf States company recently awarded contract to United Engineering & Foundry Co., Pittsburgh, for a 40-inch blooming mill, to cost $1,250,000 and by June 15 will award contract for a sheet mill at Gadsden. New plate mill will have capacity of rolling plate up to 72 inches wide and ⅝-inch thick.

CRANE ORDERS PLACED

Two 25-ton locomotive cranes for Wiley Maxon Co., Columbiaville, Pa., to Ohio Locomotive Crane Co.

Two 25-ton locomotive cranes for the Erie railroad, to the Ohio Locomotive Crane Co.

Two truck cranes for Carleton Construction Co., New York, to an unnamed seller.

Two 1-ton motor-driven ice-handling cranes, for the Central Atlantic States Service Corp., Newark, N. J., reported placed.

Among single orders were: 25-ton locomotive crane for the International Combustion Engineering Co., New York, to Browning Crane Corp.; 20-ton locomotive crane for the Lee Coal Co., Brooklyn, to Orton Crane & Shovel Corp.; 12-ton crawler crane for New York Central, to Thew Shovel Co.; used 12-ton crawler crane for Charles P. Cavanagh, Jersey City, N. J., to Philip T. King; 30-ton used locomotive crane for the Union Shipbuilding Co., Baltimore, to Philip T. King; crawler crane equipped with 2½-cubic yard bucket, for Pepper Brothers, Syracuse, N. Y., to Link-Belt Co.

CRANE ORDERS PENDING

Thirty-six 2-ton handpower pillar gib cranes for Chesapeake & Ohio railroad, Richmond, Va.; bids opened. This is the third large list for this railroad in recent weeks.

Electric crane for an incinerator plant at Providence, R. I., contemplated; Frank E. Waterman, commissioner of public works, in charge.

Sheet & Tube Purchases Second Motor

Youngstown Sheet & Tube Co. recently ordered another electric reversing motor to replace a steam engine in its Youngstown, O., plant. This is the second motor to be ordered and a third will be purchased later in completing the electrification program. The motor will drive a 40-inch blooming mill with an expected output of 100,000 tons per month under 24-hour day operation.

The motor is a 7000-horsepower, 60-120 - revolution - per - minute, direct-current reversing-mill type with an outside frame diameter of 191½ inches. The frame is constructed of two structural steel rings welded together. The motor is being manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Hoist Buying Lighter

New York, May 21.—Hoist buying fell off in April, according to the Hoist Manufacturers association. From the standpoint of number of hoists involved, the decline was 14.621 per cent and from point of valuation, a decrease of 13.589 per cent. Shipments were 6.0097 per cent smaller than in the preceding month.

An issue of $1,500,000 of Copperweld Steel Co. 6 per cent cumulative convertible preferred stock of $100 par value is being offered. The Copperweld company, of Glassport, Pa., manufactures copper-coated rods and wire products.

Construction and Enterprise

(*Continued from Page* 1445)

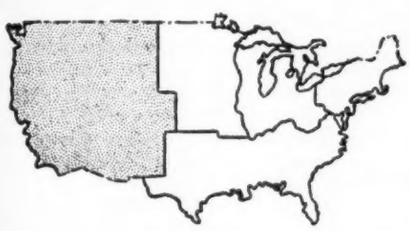
HOUSTON, TEX.—Tidal Refining Co., subsidiary of Tide Water Oil Co., 11 Broadway, New York, plans installation of power equipment in proposed refinery on Houston ship canal, where it has acquired a site.

HOUSTON, TEX.—Crown Central Oil & Refining Co. recently suffered heavy damage to its refinery by fire including destruction of a battery of high pressure stills. A. L. Lloyd is purchasing agent.

SAN ANGELO, TEX.—T. L. Hamm, San Angelo, has purchased local waterworks plant and plans improvements.

TEMPLE, TEX.—Texas Aero Corp., manufacturer of airplanes, contemplates removal of headquarters to Dallas, Tex., and establish main manufacturing plant if suitable arrangements can be made. George W. Williams is president and general manager.

RICHMOND, VA.—Standard Paper Mfg. Co., Hull and Canal streets, has awarded contract for construction of first unit of plant addition to Allen J. Saville Co. Inc., Electric building. Machinery will be installed. (Noted March 21.)

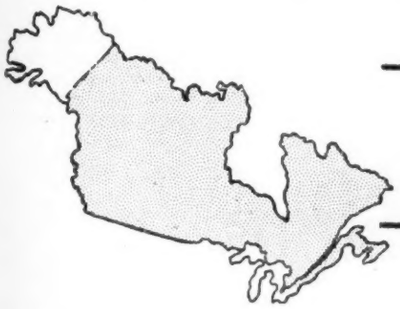


Western States

LOS ANGELES—Detrick-Joslyn Co., 110 North Alameda street, will start work immediately on a plant and warehouse. Will include overhead cranes and crane runways. Estimated cost $400,000 with equipment.

SEATTLE—Star Foundry Co., 2111 West Spokane, has leased property on Canal Waterway block No. 1 from Port of Seattle, where it will build a modern foundry. On the same block a building has been leased to the Kazian Brass Foundry.

LARAMIE, WYO.—Union Pacific railroad, purchasing department, Omaha, Nebr., has plans in progress for equipment to tie plant here, including new engine and boiler plant, new cylinder and other machinery.



Canada

EDMONTON, ALBERTA—Provincial Department of Public Works, will build repair and workshops here to cost $23,000. General contract has been awarded to Foote & Allyn, 841 Tegler building.

VANCOUVER, B. C.—J. J. Warren, president of the Consolidated Mining & Smelting Co., states a copper refinery and smelter will be built on the east coast of Vancouver island in the Comox district.

TORONTO, ONT.—Negotiations are under way between the newly-formed Canadian Conduit Pipe Co. and the Harbor commission for a three-acre site on the waterfront for the erection of a plant to manufacture wire conduit pipe, etc. Affairs of the company are being handled by Malone, Malone, Sedgewick & Montgomery barristers, 255 Bay street.

TORONTO, ONT.—James Morrison Brass Co., 93 Adelaide street west, has taken out a permit and will start work immediately on a 4-story plant addition to cost $160,000.

TORONTO, ONT.—Canadian Pacific Railway Co. has awarded contract to Anglin-Norcross Ltd., Temple building, for the erection of railway buildings to cost $800,000. Project includes the erection of roundhouse and turntable, water tank, ash handling plant, etc. Colonel Ripley, new union station, is general manager of central division.

TORONTO, ONT.—A number of subtrades have been awarded in connection with the erection of a $125,000 addition to the plant of the Prest-O-Lite Storage Battery Co., being erected at Dufferin street and Geary avenue. (Noted March 7.)

CHAPLEAU, ONT.—Chapleau Electric Light & Power Co. has contracted with the Dominion Construction Co. Ltd., Montreal, Que., and H. G. Acres & Co. Ltd., Niagara Falls, Ont., for construction of a hydroelectric power development plant here to cost $100,000. Construction work will be started immediately on a dam and power house.

OSHAWA, ONT.—The Skinner Co. Ltd., Gananoque, Ont., has purchased a site of 8 acres here and proposes to start work immediately on the erection of a plant, 100 x 400 feet, for production of automobile bumpers, etc. Proposed plant to be in operation by early next winter. Frederick J. Skinner is president, and Frederick V. Skinner, vice president.

MONTREAL, QUE.—Northern Electric Co., 121 Shearer street, has let general contract to the Foundation Co. of Canada Ltd., 746 Sherbrooke street west, for erection of an addition to its plant to consist of two buildings, one eight and the other 4-stories. (Noted March 14.)

WEYBURN, SASK.—City council has approved plans for the expenditure of $65,000 on additions to city power plant here. The purchase of 750 kilowatt unit is being considered.

Recent Incorporations

ST. PETERSBURG, FLA.—Leonard Spark Plug Co. has been incorporated to manufacture spark plugs, by Caleb Leonard, and E. E. Rieck, 1345 Forbes street, Pittsburgh. It plans to use building at Fifty-sixth avenue and Twelfth street north, temporarily.

ABINGDON, ILL.—Illinois Airways Corp. has been incorporated with 50,000 shares class A common and 40,000 shares class B common no par value to manufacture and deal in airplanes, hydroplanes, dirigibles, motor boats, accessories, etc., by G. S. Schugmann, H. M. and J. E. Stringfellow.

CHICAGO—Federal Tool Corp., 2708 North Ashland avenue, has been incorporated with $60,000 capital to manufacture and repair tools, gages, machinery, etc., by Rudolph Bernhardt.

CHICAGO—Dijon Aeronautical Corp., 39 South LaSalle street, has been incorporated with 50,000 shares no par common stock to manufacture and sell aeroplanes, parts and accessories, by Robert J. Koeppe.

BOSTON—Electric Billboard Corp. has been incorporated with $50,000 capital to manufacture and erect advertising machines. Karl E. Orstedt, 177 Mason street, Brookline, Mass., is president.

BOSTON—B. F. Deming Co., 64 Brookline avenue, has been incorporated with $10,000 capital to manufacture computing and recording devices of all kinds, by Benjamin F. Deming, 14 Orkney road, Boston.

BOSTON—Squires Sprague Inc. has been incorporated with $200,000 capital to manufacture cigaret cases, lighters, etc. William E. Young, 147 University road, Brookline, Mass., is president.

DRACUT, MASS.—New Home Washing Machine Co. has been incorporated with $25,000 capital to manufacture washing machines, machinery and developing new devices, by Ernest J. Paquette, 566 School street, Lowell, Mass.

MALDEN, MASS.—Metropolitan Plating Corp., 35 Irving street, has been incorporated with 200 shares no par value stock to engage in wholesale and retail plating of metals. Lucius E. Thayer, 48 Warren street, Newton, Mass., is president.

SPRINGFIELD, MASS.—United Wheel & Rim Co., 136 Dwight street, has been incorporated with 5000 shares no par value to manufacture wheels, hubs, spokes, rims, etc. Paul V. Bailey is president.

WALPOLE, MASS.—Hollingsworth & Voe Co., 333 Washington street, is having plans prepared for 1-story machine shop, 35 x 225 feet. C. Eldred is engineer, care owner.

KANSAS CITY, MO.—Centropolis Crusher Co. has been incorporated with $50,000 capital by William A. Ross, Twenty-fifth and Summit streets.

New Construction and Enterprise

JERSEY CITY, N. J.—Rotary Duplicator Mfg. Co. has been incorporated with 100 shares common stock to manufacture machinery by Registrar & Transfer Co., 15 Exchange place, Jersey City.

NEW BRUNSWICK, N. J.—Fowler Aeroplane Wings Inc. has been incorporated with 10,000 shares common stock to manufacture aircraft, by John Fuchs, 354 George street, New Brunswick.

UNION CITY, N. J.—Eifler Electric Co. Inc. has been incorporated with $125,000 capital to manufacture and deal in electrical machinery by Harvey Bein, Union City.

BUFFALO—J. L. Osgood Machinery & Tool Co. has been incorporated by J. L. Osgood, 395 Linwood avenue, Buffalo.

NEW YORK—Adept Machine & Tool Co. has been incorporated with $10,000 capital by M. Rosenbluth, 339 Canal place, New York.

CLEVELAND—Great Lakes Machine Tool Co. has been incorporated with 250 shares no par value stock, by William M. Durkin, Leader building, Cleveland.

LOGAN, O.—Westbrook Engine & Machine Co. has been incorporated with 4000 shares no par value stock, by W. S. Westbrook.

TOLEDO, O.—Standard Locomotive Equipment Co. has been incorporated with 2000 shares no par value stock, by W. W. Campbell, Ohio building, Toledo.

BRADDOCK, PA.—Wilson-Snyder Mfg. Co. has been incorporated with $600,000 capital to manufacture and sell machinery, engines and other metal products. G. Fred Goetzinger, 88 Evans avenue, Pittsburgh, is treasurer.

CORRY, PA.—Standard Automatic Products Corp. has been incorporated with 2250 shares no par to manufacture and deal in airplane parts, automobile parts and other metal specialties. C. F. Bliss, Corry, is treasurer.

JOHNSTOWN, PA.—Air Service Inc. has been incorporated with $50,000 capital to manufacture airplanes. W. H. Ritter, Johnstown, is treasurer.

PHILADELPHIA—Smith Twin Tubular Boiler has been incorporated with $600,000 capital to manufacture and sell boilers and heating appliances of all kinds. C. Elmer Woolston, 1510 North Twenty-eighth street, Philadelphia, is treasurer.

PHILADELPHIA—Lebanon Boiler Works Inc. has been incorporated with $75,000 capital to manufacture and sell boilers, tanks, etc. Elizabeth A. Bailiff, 113 North Third street, Philadelphia, is treasurer.

PITTSBURGH—American Machine & Engineering Corp. has been incorporated with $25,000 capital to manufacture and repair, sell engines and machinery, parts and accessories. Howard B. Kirchner, 1464 Edgehill avenue, Dormont, Pittsburgh, is treasurer.

RANKIN, PA.—Nicholson & Co. has been incorporated with $100,000 capital to manufacture and deal in chains, forgings, metals and metal products. David K. Nicholson, 218 North Dallas avenue, Pittsburgh, is treasurer.

SCRANTON, PA.—Steel Shelving & Partition Co. has been incorporated with $50,000 capital to manufacture and sell shelves, lockers, partitions, cabinets, etc. Leo Schimpff, Allentown National Bank building, Allentown, Pa., is treasurer.

WILKES-BARRE, PA.—Aluminum Novelty Mfg. Co. has been incorporated with $12,000 capital to manufacture and sell products made of aluminum and metal. E. W. Friedman, 206 North Main street, Wilkes-Barre, is treasurer.

NASHVILLE, TENN.—Kerrigan Ornamental Iron Works has been incorporated with $10,000 capital, by W. H. Levine, Francis J. McCarthy and Phillip Kerrigan Jr.

DALLAS, TEX.—Dallas Boiler & Tank Co. has been incorporated with $50,000 capital, by Henry L. Hinckley, Tom B. Burnett and J. H. Hinckley.

DALLAS, TEX.—Ace Heater Mfg. Co. has been incorporated with $15,000 capital, by Thomas A. Kingsworthy, 600 North Madison street.

WICHITA FALLS, TEX.—Tancred Salvage & Erection Co. has been incorporated with $6000 capital, by John Tancred, care Panhandle Steel Products Co.

BEDFORD, VA.—Bedford-Armstrong Corp. has been incorporated with $1,000,000 capital to manufacture and deal in vending machines, by H. E. Armstrong, Bedford.

PETERSBURG, VA.—Southern Iron & Steel Equipment Co. Inc. has been incorporated with $25,000 capital by M. C. Liphart.

WINNIPEG, MAN.—Wright Automatic Lock Nut Co. Ltd. has been incorporated to take over the business of the Wright Self Locking Nut Co. Ltd. with $200,000 capital, by John W. Wright, David R. Williams, John M. Mickols, and others all of Winnipeg.

FORD CITY, ONT.—Hercules Products Ltd. has been incorporated to manufacture automobiles, motors, engines, pumps, and parts thereof, with $100,000 capital stock, by Halsey V. Welles, Gerald McHugh, Lewis A. McHugh, all of Windsor.

TORONTO, ONT.—Toronto Airport Ltd. has been incorporated to manufacture and deal in airplanes, aircraft engines and devices, with $625,000 capital stock, by Thomas N. Phelan, Lester H. Clayton, Edson L. Haines, all of Toronto.

New Trade Publications

RARE EARTHS—Adam Hilger Ltd., London, Eng., has published a pamphlet giving the prices and describing a number of pure rare earths and metals it can supply for spectroscopic and other research purposes.

REVERSING LINE STARTERS—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has issued a leaflet on the application, operation and construction of its reversing line starters for equirrel-cage induction motors.

MINE SCRAPER HOIST—American Hoist & Derrick Co., St. Paul, has issued an illustrated folder describing its mine scraper and hoist. It is operated by compressed air, is compactly built and made rugged for exacting service.

AUTOMATIC TEMPERATURE CONTROL—C. J. Tagliabue, Brooklyn, N. Y., has issued a folder giving information on the necessity of maintaining proper temperature control in plating baths. Automatic control units made by the firm also are described.

CASTER AND TRUCK WHEELS—Divine Bros. Co., Utica, N. Y., has issued a catalog of its canvas cushion caster and truck wheels. Illustrations show its construction, compression of fabric to form the tire, type of bearings used and method of applying wheels and casters.

CONCRETE CLIPS—Consolidated Expanded Metal Companies, Wheeling, W. Va., have isued a leaflet illustrating a device for making hairpin clips for placing expanded metal lath. The machine makes possible rapid production of clips of various sizes on the job.

SOAKING PITS—Chapman-Stein Co., Mt. Vernon, O., in a current reprint shows the design and operation of a recuperative soaking pit recently installed by that company for a steelmaker. Blueprints of layout of this and other installations are shown.

ELECTRICAL DEVICES—Recent bulletins of the General Electric Co., Schenectady, N. Y., include: Direct-heat electric furnaces, enclosed magnetic switches, solenoid operated valves, squirrel cage motors, tempering baths. Each is illustrated and application of the device is described.

STRUCTURAL SYSTEM—Leslie G. Berry, structural engineer, Charlotte, N. C., has published a booklet on his method of construction, using steel columns with concrete floors. Drawings of details of construction illustrate the method employed to erect buildings by this plan.

TEMPERATURE CONTROL—Savings possible by standardized pickling of metals are suggested by Weaver Bros. Co., Adrian, Mich., using the Foxboro automatic temperature control to keep temperature uniform. A blueprint of an installation shows the method of application.

ALUMINUM ALLOY CASTINGS—Toledo Alloyed Castings Co., Toledo, O., in a current booklet presents the relative merits of permanent mold and sand cast process and the service the company gives by either process. Advantages of each are presented. The booklet is well illustrated and the service offered by the company is described in the text.

ELECTRIC HEAT TREATING—Electric Furnace Co., Salem, O., manufacturer of electric furnaces, is publishing a booklet listing various parts and materials being treated in electric furnaces built by that company. It shows furnaces specially designed for handling these products and several unusually large annealing and heat treating furnaces.

PHYSICAL TEST APPARATUS—Adam Hilger Ltd., London, Eng., has published two bulletins describing its photo-elastic apparatus for determining the distribution of stress in structural and machine members, and its lateral extensometer and recording device for measuring stress distribution in materials, determination of Poisson's ratio, etc.

HARDNESS INDICATORS—Shore Instrument & Mfg. Co., Jamaica, N. Y., recently has issued a folder on its constant diameter hardness indicator. It explains the principles of design of the machine and its application to measuring hardness of various types. The company also is issuing a reprint of a paper on this device, presented before the American Society for Steel Treating.

SAND HANDLING EQUIPMENT—Universal System of Machine Moulding & Machinery Co. Ltd., 13-15 Wilson street, London, Eng., has published a catalog describing and illustrating its sand handling equipment. It includes sand mills, disintegrators, riddles, rubbing machines, core sand mixers, core making machines, ovens, various types of tumbling mills and several other different machines. The various machines are illustrated and their specifications are given.

Timken-equipped Machines Scarcely Notice Changing Dates

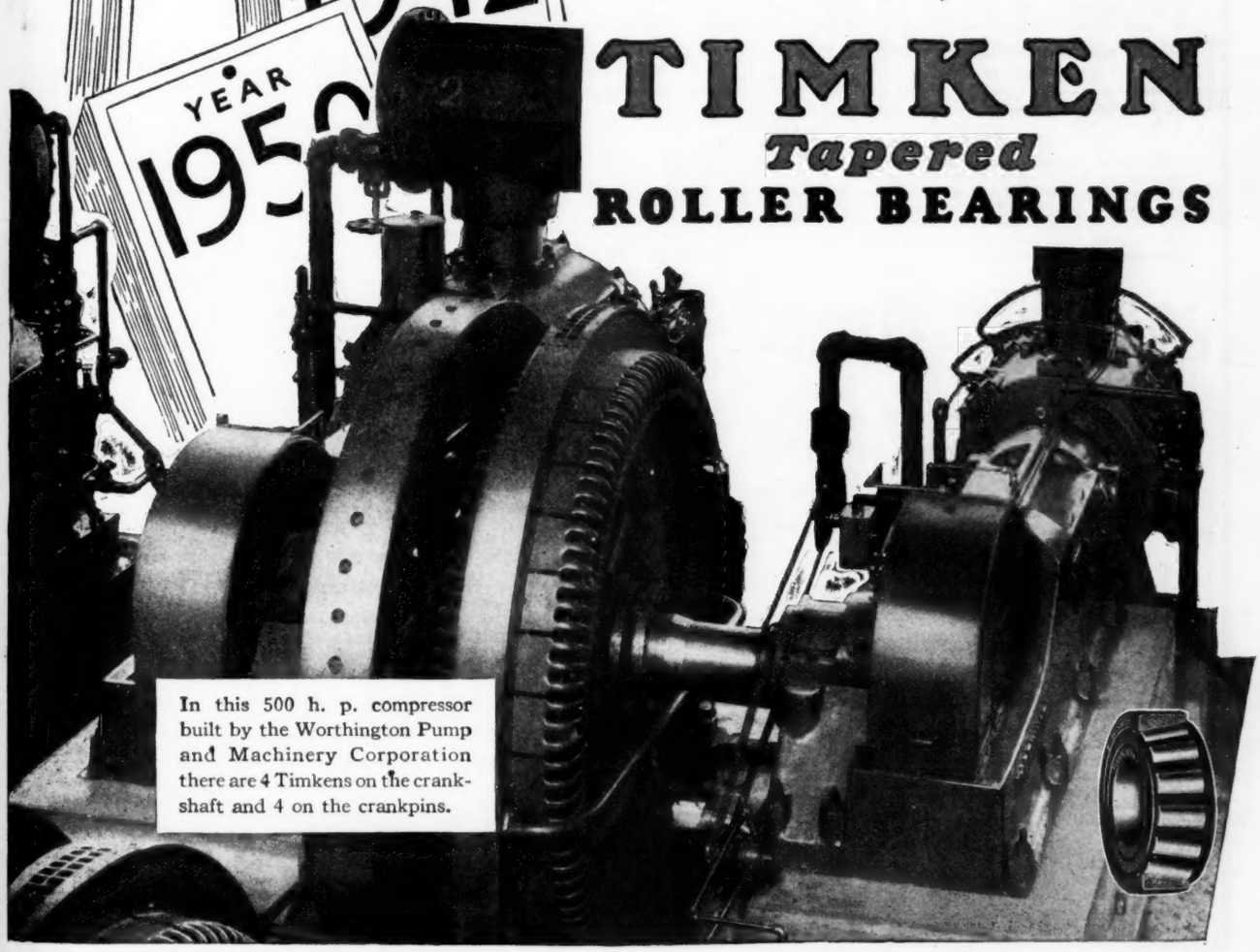
Time—what is time to Timken Bearings? It is just the test that they were made to withstand. The daily grind of load and thrust only serve to bring out Timken *endurance.*

But lengthened service is only one of many Timken advantages. Conservation of power is a daily achievement. Saving lubricant is another. And practically all time-eating attentions are eliminated while Timkens are lessening friction and supplying the other typically Timken benefits.

All Industry knows the economies of the exclusive Timken combination—Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken electric steel.

THE TIMKEN ROLLER BEARING COMPANY
C A N T O N , O H I O

TIMKEN
Tapered
ROLLER BEARINGS



In this 500 h. p. compressor built by the Worthington Pump and Machinery Corporation there are 4 Timkens on the crankshaft and 4 on the crankpins.

Pipe and Tube Prices—Plate Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 8-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRILLED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

Lap Weld

To large jobbers these discounts are increased on black by 1 point and a supplementary discount of 5 per cent; on galvanized by 1½ points with a supplementary 5 per cent. Extra 5 per cent granted in the 4th quarter 1927 and 1st quarter 1928 discontinued April 2, 1928.

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLING

Butt Weld

	Black	Galv.
¼ and ⅜-inch	+11	+36
½-inch	23	5
¾-inch	28	11
1 and 1¼-inch	31	15
1½ and 2-inch	35	18

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	9
2½ to 3½-inch	28	12
4 to 6-inch	30	17
7 and 8-inch	29	16
9 to 12-inch	26	11

REAMED AND DRILLED

2-inch to 6-inch—Two points less than above

EXTRA STRONG, PLAIN ENDS

¼ and ⅜-inch	+13	+48
½-inch	23	7
¾-inch	28	12
1 to 2-inch	34	18

Lap Weld

2-inch	29	13
2½ to 4-inch	34	20
4½ to 6-inch	33	19
7 and 8-inch	31	17
9 to 12-inch	21	8

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

Jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized wrought iron pipe.

On extra or double extra strong pipe fitted with threads and couplings basing discount lowered 5 points from plain end price. Fitted with threads only, basing discount lowered 3 points for random lengths.

Boiler Tubes

Pittsburgh carload discounts

STEEL (Lap Weld)

2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ to 3¾-inch	56 off
4-inch	59 off
4½ to 6-inch	48 off

Subject to two 5 per cent discounts on full carload shipments. On less than 10,000 pounds, base discount reduced 6 points and one 5 per cent allowed. On 10,000 pounds to carload, base discount reduced 4 points and two 5 per cents allowed.

CHARCOAL IRON

1½-inch	1 off
1¾-inch	8 off
2 and 2¼-inch	13 off
2½ and 2¾-inch	16 off
3-inch	17 off
3¼ to 3½-inch	18 off
4-inch	20 off
4½-inch	21 off

Subject to 10 per cent discount on full carload lots. On less than 10,000 pounds, base discount reduced 2 points and no preferential allowed. On 10,000 pounds to carload, 5 per cent preferential allowed.

SEAMLESS COLD DRAWN

1-inch	63 off
1¼ and 1½-inch	55 off
1¾-inch	39 off
2 and 2¼-inch	34 off
2½ and 2¾-inch	42 off
3-inch	48 off
3¼ and 3½-inch	50 off
4-inch	53 off
4½, 5 and 6-inch	42 off

SEAMLESS HOT ROLLED

1¾-inch	39 off
2 and 2¼-inch	40 off
2½ and 2¾-inch	48 off
3-inch	54 off
3¼ and 3½-inch	56 off
4-inch	59 off
4½, 5 and 6-inch	48 off

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed.

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off
Carbon 0.30 to 0.40 per cent.....45 to 50 off

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	**12-gage**	**16c**
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	38c
5⅝-inch	9-gage	50c
5½-inch	9-gage	52c

Plus usual extras for forming and for lengths over 24 feet.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, date Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weight.

Over 100 to and including 110 inches	.05c
Over 110 to and including 115 inches	.10c
Over 115 to and including 120 inches	.15c
Over 120 to and including 125 inches	.25c
Over 125 to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 to and including 84 inches	.10c
Over 84 to and including 96 inches	.20c
Over 96 to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including ⅜-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds square foot..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including ⅜-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds square foot.... .20c
Plates ordered 7.65 pounds square foot .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A-B	1.50c

Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

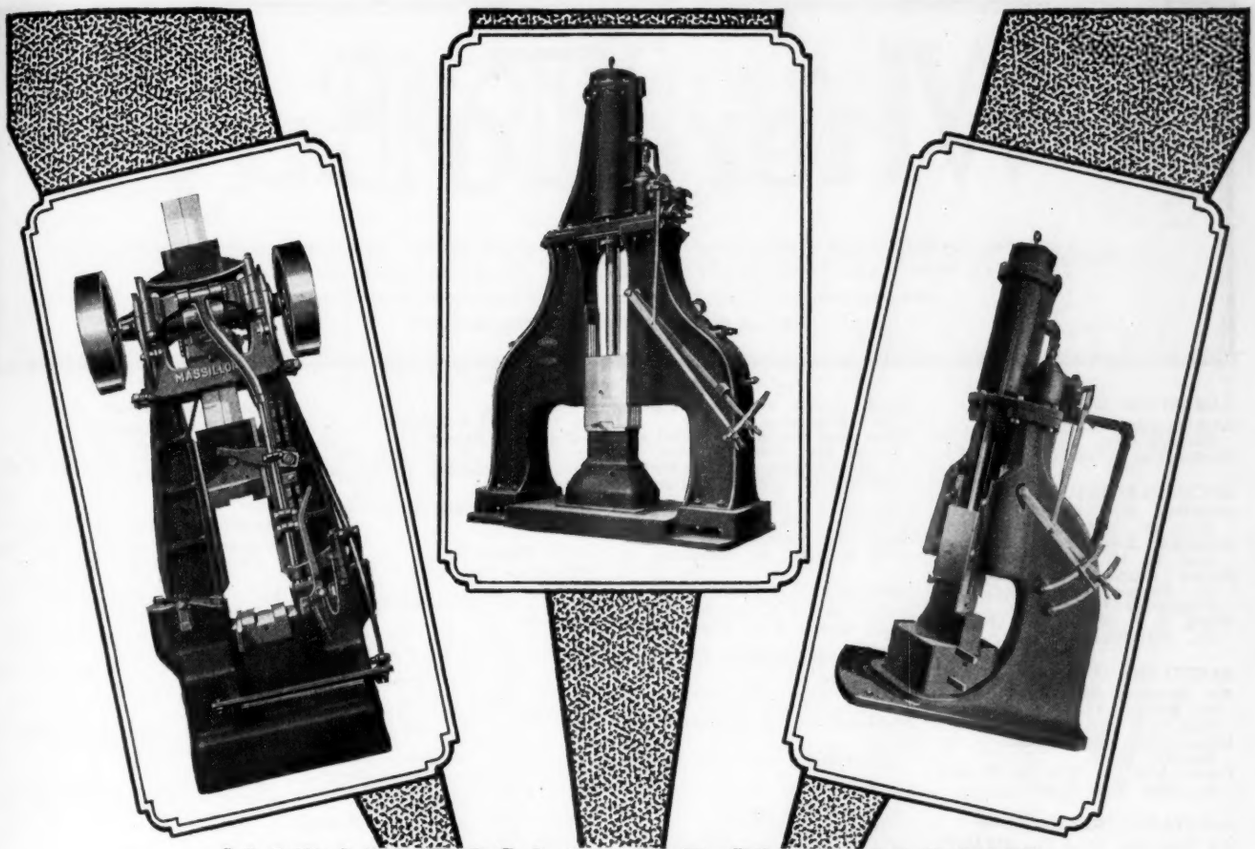
Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)
Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with reentrant angles)
Additional extra ..... .20c



INDUSTRIAL BROWNHOIST

MASSILLON

Quality Hammers—Insure Profits

Industrial Brownhoist have been building quality machinery for over a half century. The products of their three large plants have established a world wide reputation for durability and workmanship.

It is with this background that they now offer you a complete line of Massillon Hammers, backed by a well established nation-wide service. This new line comprises many sizes of Steam Drop, Board Drop, Double and Single Frame Forging, and Tool Dressing Hammers.

Send for Bulletins.

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco.

Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

INDUSTRIAL BROWNHOIST

"Where-To-Buy"

A classified by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶Index to advertisements will give you page number of any advertisers and by referring to advertisement you can get full particulars about products.

ABRASIVES (Polishing)
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

ACETYLENE (Dissolved)
Air Reduction Sales Co., 342 Madison Ave., New York City.
International Oxygen Co., Newark, N. J.
Prest-O-Lite Co., The, 30 E. 42nd St., New York City.

ACETYLENE GENERATORS
Air Reduction Sales Co., 342 Madison Ave., New York City.
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

ACETYLENE IN CYLINDERS
Air Reduction Sales Co., 342 Madison Ave., New York City.
International Oxygen Co., Newark, N. J.
Prest-O-Lite Co., The, 30 E. 42nd St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

ADAMITE ROLLS
American Adamite Co., The, 410 Oliver Bldg., Pittsburgh, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS
Driver-Harris Co., Harrison, N. J.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Metal & Thermit Corp., 120 Broadway, New York City.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM
Summerill Tubing Co., Bridgeport, Pa.

ALUMINUM (Vanadium)
Vanadium Corp. of America, 120 Broadway, New York City.

ALUMINUM BRONZE (Acid Resisting)
Duriron Co., Inc., The, Dayton, Ohio.

ANGLES, TEES, CHANNELS—See STEEL (Structural)

ANNEALING BOXES
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Petroleum Iron Works Co., The, Sharon, Pa.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.

ANVILS (Cast Steel)
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

APPRAISALS
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

ARCHES (Suspended)
Detrick, M. H., Co., 140 S. Dearborn St., Chicago, Ill.

ARCHITECTS (Industrial)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Champion Machine & Forging Co., 3675 E. 78th St., Cleveland.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Williams Alloy Products Co., The, Elyria, Ohio.

BALING PRESSES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

BANDS (Iron)
Bethlehem Steel Co., Bethlehem, Pa

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., 71 Broadway, New York City.

BARRELS (Steel)
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.

BARS (Alloy)
Central Alloy Steel Corp., Massillon, O.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

BARS (Concrete Reinforcing)
American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y
Franklin Steel Works, Franklin, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Migret, Rene, 7 Boulevard DeFontaine, Charleroi, Belgium.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Pacific Coast Steel Co., Hunter-Dulin Bldg., San Francisco, Calif.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Migret, Rene, 7 Boulevard DeFontaine, Charleroi, Belgium.
Phoenix Iron Co., The, 20 So. 15th, Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

BEARING METAL
Williams Alloy Products Co., The, Elyria, Ohio.

BEARINGS (Ball)
New Departure Mfg. Co., The, Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Journal)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Hyatt Roller Bearing Co., Newark, N. J.
Timken Roller Bearing Co., The, Canton, O.
Williams Alloy Products Co., The, Elyria, Ohio.

BEARINGS (Motor)
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Roller)
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

BEARINGS (Tapered Roller)
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Thrust)
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS AND BUSHINGS (Brass and Bronze)
Erie Bronze Co., 402 W. 19th St., Erie, Pa.
Williams Alloy Products Co., The, Elyria, Ohio.

BENDING AND STRAIGHTENING MACHINES
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Hinman, D. A., & Co., Sandwich, Ill.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, O.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh, Pa.

BILLETS (Alloy and Carbon Steel)
Central Alloy Steel Corp., Massillon, O.
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Die Stock Steel)
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.

BILLETS (Forging)
Bethlehem Steel Co., Bethlehem, Pa.
Central Alloy Steel Corp., Massillon, O.
Erie Forge Co., Erie, Pa.
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.
Heppenstall Forge & Knife Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Wood, Alan, Steel Co., Conshohocken, Pa.

BILLETS (Forging, Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.

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